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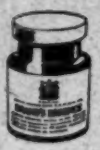

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BRITISH MEDICAL JOURNAL

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THE TAKING OF THE CENSUS, 1801-1951*

BY

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Though not as old as the formation of the State itself, the taking of a census is one of the earliest manifestations of an organized society. A Government preparing to make war or levy taxation found it useful to know the numbers of at least certain classes in its population, and in the early democratic communities electoral lists had to be compiled. The Sumerians of the third millennium B.C., the Egyptians, Jews, Greeks, and Romans, all conducted surveys which merit the broad designation of census. In England the Domesday survey, though based on land rather than population, falls into the same category. The distinctive characteristic of the modern census, however, lies not in its comprehensiveness or its relative accuracy but in the regularity with which the enumeration is undertaken. Every 10 years since 1801 in Great Britain—with one notable recent exception—a census has been held, and in other countries it is an even more frequent but equally regular event.

History

The history of the modern census in England may be said to begin with the "Bill for taking account of the Number of People and of the total Number of Marriages, Births and Deaths; and also of the total Number of Poor receiving Alms from every Parish and extra-parochial Place in Great Britain," which was introduced into the House of Commons in March, 1753, apparently with ministerial support. Reports of eighteenth-century debates are somewhat unreliable in detail, but there is no doubt about the spirited discussion which accompanied this measure through all its stages in the Commons.

Its principal opponent was William Thornton, M.P. for York, who viewed the institution of an annual enumeration as "totally subversive of the last remains of English liberty." "An annual register of our people," he is reported to have said, "will acquaint our enemies abroad with our weakness, and a return of the poor's rate, our enemies at home with our wealth. Our enemies abroad are the Spaniards and the French, and our enemies at home are place-men and tax-masters. . . ." A census, he maintained, was the first step on the way to the establishment of a police State ("a government *en police*"). "We are to entrust petty tyrants with the power of oppression, in confidence that this power shall not be executed; to subject every house to a search; to register every name, age, sex, and state upon oath; record the pox as a national distemper and spend annually £50,000 of the public money—for what? To decide a wager at White's!" Any enumerator who came his way would receive "the discipline of the horse-pond."

Other critics quoted David's self-confessed sin in numbering the Children of Israel and its consequences (2 Samuel, xxiv) to demonstrate the inadvisability as well as the impiety of the project—perhaps a shrewd thrust at the Archbishop of Canterbury's son, Thomas Potter, who was the Bill's chief sponsor. Yet, in spite of this strongly worded opposition and other more moderate objections, an amended Bill passed the Commons only to be rejected by the Lords.

Census Act of 1800

In the light of this experience, the easy passage of the Census Bill of 1800 may appear surprising, especially as for nearly half a century parliamentary advocates of an enumeration had allowed the question to lie dormant. But circumstances and ideas had changed since 1753. England in 1800 was a country already seven years at war and, standing virtually alone against Napoleon, was threatened by possible blockade and invasion. Population was growing—though some contemporary observers denied the fact—and industry was making increasing demands on labour: the days of self-sufficiency were passing and there was understandable anxiety about food supplies. The operation of the Speenhamland System, tending as it did to force down rural living standards towards a mere subsistence level, reinforced such misgivings.

Here was fertile soil for the ideas which Thomas Malthus propounded in the *Essay on the Principles of Population*, published in 1798. If population growth would always tend to outstrip food supply, as Malthus contended and as contemporary evidence increasingly confirmed, a nation at war must suit its policies to the situation, and the foundation of such policies was an accurate statistical assessment of the factors involved in the case. Though the name of Malthus does not appear to have been mentioned in the debate of 1800 there is little doubt that his work had paved the way for the favourable reception of the Bill. The serious harvest failure of 1800, however, proved the most forcible argument for the measure. The Bill was introduced on November 19, 1800, and received the Royal Assent on the last day of the year; 10 weeks later a census was being held in Great Britain—11 years after the first decennial enumeration in the United States.

The Census Act of 1800 was the first of a series of 12 such enactments made at the end of each decade and providing for the taking of a census in the succeeding year. It was not until 1920 that Parliament decided to entrust to the Government the power to hold censuses without the formality of the presentation of a Bill. Under present legislation the Government must lay before

*A lecture delivered in University College, London, on March 1, 1951.

Parliament an Order in Council for the census setting out the questions which it is proposed to ask, but criticism of these detailed provisions is the limit of parliamentary interference. The Act of 1920 further empowered the Government to take enumerations at intervals of not less than five years if it so wished—a step long advocated, and already taken in America.

In spite of the existence of this greater opportunity, the last 30 years have seen the holding of only two censuses, preoccupation with other matters precluding an enumeration in 1941—an odd fate for an institution which had its birth and justification in a time of war. This hiatus in the census returns provides a commentary both on the totality of modern warfare and on the omniscience of the State, which can largely* use the Registrar's quarterly returns, the ration book, and the labour exchange to supply information which formerly only the census provided.

The Machinery of Administration

The legislation of 1800 not only conceded the principle of holding a census but determined the machinery by which it should be undertaken. Through the county courts in England and Wales access could be obtained to the two overseers of the poor in each parish, who were at once the most appropriate and easily available local officials to undertake the work of enumeration. At the same time the local incumbent could be expected to furnish certain additional information from the parish registers. In Scotland the absence of a class of overseers made it necessary to find some alternative enumerator, and the choice normally fell on the local schoolmaster.

The overseers were instructed to prepare a return to the questions asked in the census schedule "by proceeding together or separately from House to House, or otherwise, as they shall judge expedient for the better Execution of this Act." Subsequently the returns were to be laid before the Justices of the Peace, who were empowered to examine the overseers upon oath about their contents. In their turn the justices were required to deliver the schedules to the High Constables, from whom they were to pass to London through the hands of the clerks of the peace or the town clerks. The incumbent, meanwhile, was required to transmit the parish register return through his bishop and archbishop to the Privy Council, whose responsibility was to lay an abstract before Parliament. The final responsibility for "digesting and reducing to order" the entire census material lay with one of the Clerks of the House of Commons.

The machinery of enumeration did not prove ineffective, but it was not without its drawbacks. Between John Rickman, who was responsible for the central organization, and the overseers in the parishes there stood a multitude of officers, but they were channels of communication rather than active participants and guides in the operation. At the parish level, in spite of the fact that the Act enabled the overseers to call upon the services of "churchwardens or chapelwardens, sidesmen, parish clerks, vestry clerks, constables, tythingmen, headboroughs or other peace officers," there is no doubt that the main burden fell on the overseers themselves. These were men of greatly varying ability. As Rickman himself said: "These Overseers, who seem to have put themselves in motion with much alacrity since the first Enumeration of 1801, must not be deemed an educated class of men; the great majority of them are occupiers of land who fill the office by turns in their respective Parishes; who answer plain questions with much sincerity, but to whom difficult Questions cannot be propounded without incurring the risk of retrograding instead of advancing in knowledge; that is, of arriving at misinformation instead of resting in acknowledged ignorance."

From the outset the overseers had been paid for undertaking this added responsibility, and any disposition to resent the new burden had been thereby minimized, but their task had not been made easier by the circumstances in which they worked. Parishes varied greatly in population, and the achievement of an accurate enumeration was particularly difficult in the growing urban areas. Householders did not receive schedules, and the overseer made all his returns on a single sheet. There was no record of names, only of numbers, and this made a check of the accuracy of the returns virtually impossible. The conscientiousness and disinterestedness of the overseers apparently largely offset these difficulties, but there was much room for the entry of error.

Reform in Census Procedure

Until 1841 this form of procedure remained unchanged, but during the 'thirties the spirit of Bentham and the energy of his disciple, Edwin Chadwick, were reshaping the fabric of English civil administration. The census was one beneficiary of this period of reform. The Poor Law Amendment Act of 1834 created the Union as the general unit of Poor Law administration, and this new subdivision was adopted first for registration and then for census purposes. The Municipal Corporations Act of 1835 paved the way for the creation of a new order of local government officers who were to become the backbone of the enumerating class. Finally, the General Registry Act of 1836, providing for the compulsory civil registration of births, marriages, and deaths, not only ultimately furnished a check on the overall accuracy of the census figures but created a hierarchy of officials in daily contact with vital statistics through whom the census could be conducted. The year 1834 also saw the establishment of the Statistical Society of London (later to become the Royal Statistical Society), whose criticism and advice from 1840 onwards largely influenced the form and scope of the census.

The newly created body of registration officials was brought into service for the census of 1841. To the local registrar—responsible for a district which on the average contained upwards of 7,000 persons—fell the task of selecting enumerators whose range of operations was to extend at the most to 200 households and on average to about half that amount. The burden of form-filling was now shifted from the overseer to the householder, a step making for greater accuracy in the returns and enabling more detailed information to be obtained. The new system, however, was not without its teething troubles. Papers were lost or incorrectly filled up, and in some instances householders refused to make returns. In certain parts of London "inhabited by the lower orders," said *The Times*, "it was deemed necessary that the enumerators should be accompanied by a policeman," while at Brighton a certain captain, obviously in the direct line of William Thornton, dispatched both the census form and the summons which followed it into the street. Nevertheless the machinery

*Largely, but not wholly even where the most orthodox census information is required: the National Registration undertaken in September, 1939, sought information about sex, age, and occupation of the entire civilian population—a virtual census.

had come to stay. In 1851 the census forms were passed down through 624 superintendent registrars, 2,190 registrars, and 30,610 enumerators to some 4,300,000 householders, from whom they made the same return journey to the Registrar-General.*

Reliability of Enumerators

The machinery thus established in 1841 has remained essentially unchanged to the present day; but its longevity is not proof that it has been free from problems and weaknesses. As recently as 1931, for example, a suggestion from the Registrar-General that a proportion of the enumerators might be recruited from among the unemployed led some well-meaning but misguided local authorities to refuse facilities for their officers to undertake census duties. In consequence large numbers of unemployed persons were enlisted, many of whom were wholly unsuited to the work.

The result in its more unfortunate aspects was described by the Registrar-General himself in his subsequent report. "During the actual course of their duties a small number of unemployed persons defaulted in order to take up regular employment, while in a few cases the local census officer was obliged to supersede the enumerator and to make emergency arrangements for the completion of his work. One enumerator disappeared in the course of enumeration with his enumeration book and partially collected schedules: in a small number of cases information came to hand that substantial omissions had occurred in the enumeration. In one of the latter instances it was discovered that the enumerator (who stated subsequently that he had been under treatment in a mental hospital) had been preparing fictitious returns to avoid the difficulty of obtaining them from the public. The enumerators concerned in all these instances were unemployed men." Nevertheless the Registrar-General was able to make good these deficiencies and confidently claim that the enumeration had been fully and exhaustively completed.

Form of the Inquiry

The census of 1801 attempted to give the answer to three problems—the size and distribution of the population, the number of houses inhabited and uninhabited, and the number of persons engaged in the three broad categories of agriculture, commerce, and manufacture or handicraft. The return under the third head was vitiated by a confusion about whether a return of families or individuals was required; on the accuracy of the other returns it will be more appropriate to speak later. The same simple information was sought in the three succeeding censuses, with the addition of a question about age in that of 1821. In 1811 the occupational query was clarified: a return of the occupations of families was asked for—evidence that the onset of the Industrial Revolution had not yet dealt widespread blows at the economic unity of the family.

The census of 1841, with its new machinery and personnel, however, provided the opportunity for a great forward step. Not only was a detailed occupational survey successfully attempted, but a question on place of birth was also included. This enumeration paved the way for the even more ambitious mid-century survey, which afforded evidence on marital status and the incidence of physical disabilities, included a more detailed survey of age groups and birthplaces, and presented, together with a systematic census of occupations, information about the size of businesses and the area of farms. To these were added a census of church buildings and attendances and an educational survey, significant not only for the information which they contained and the interests which they reflected but also as the first venture of the census department into fields wholly unrelated to its initial inquiries.

The wedding of the Census Returns and the annual returns of births, marriages, and deaths forthcoming from the Registrar-General was one of the most fruitful results of the reforms of the eighteen-thirties. Once a large measure of accuracy had been introduced into these returns, their union opened up new fields of social investigation. It was now possible to observe more closely the trend of vital statistics, to trace the connexion between housing, sanitary and industrial conditions and the incidence of disease, and to focus attention on those districts where the need for the combined action of the local authority and medical practitioners was most acute. An early example of this new use of census material is to be seen in the provision of the Public Health Act of 1848 that the central Board of Health might compel the institution of local boards where the death rate of an area exceeded 23 per thousand —a standard of relative need which could not have been established in days when the Abstract of Parish Registers and Bills of Mortality furnished the only crude measure of varying death rates.

From 1851 the field of investigation has steadily widened. Under the influence of William Farr (1807–83), an early student of University College, London, with a medical training, who was appointed Compiler of Abstracts in the General Register Office in 1839, the census was increasingly used to furnish evidence about social problems. This new interest was reflected not only in the reports accompanying the census, for many of which Farr was directly responsible, but also in the nature of the questions asked. Farr, a prodigious and precise worker, rose steadily through the stages of the hierarchy of census and registration officials, but to his unconcealed disappointment the crowning office of Registrar-General eluded him, and he resigned from the department in 1879.

The census of 1911 was notable for the introduction of a section covering fertility, a line of inquiry not subsequently pursued in the census, but about to be taken up again in 1951; that of 1921 had questions on dependency, also not repeated in the somewhat unambitious 1931 census; while, in addition to the fertility inquiry, the census-schedule of 1951 will contain questions about the age at which full-time education is completed, and about household amenities. In spite of this steady broadening of the scope of inquiry, the British census has fallen well behind that of the United States in the range of its investigations, but it seems probable that the extension of range in the United States has produced greater inaccuracy of returns, especially where the questions bear least relation to the orthodox purposes of census-taking.

Accuracy of the Census

Accuracy is the first essential of a successful census. How has the British census stood up to this test? About the accuracy of the early censuses one contemporary at least had strong opinions. William Cobbett wrote in 1822: "I do not believe one word of what is said about

*Scotland, with no system of registration, continued to conduct its census through the old machinery until 1861.

the increase of the population. All observation and reason is against the fact; and, as to the *parliamentary returns*, what need we [say] more than this: that *they* assert that the population of Great Britain has increased from ten to fourteen millions in the last *twenty years*! That is enough! A man that can suck that in will believe, literally believe, that the moon is made of green cheese." But Cobbett was scarcely an impartial judge where the repercussions of the new economic order were concerned, and his opinion is a curiosity worthy of remark but not of more serious consideration.

Errors in the census may be traced to two main sources—to failures at the centre and to human weaknesses in the actual filling in of forms. Defects in the machinery of administration and ambiguities in the form of questions will tend to produce general errors; more specific local inaccuracies arise out of negligence on the part of enumerators, the ignorance of householders and their failure—conscious or otherwise—to furnish correct information. Before the long and varied tables of the British census are submitted to scrutiny two general points are worthy of notice. First, that in the early part of the nineteenth century typographical errors were not infrequent in Government publications and that statistical tables were also subject occasionally to this defect. There is no evidence, however, that the census was peculiarly liable to this failing—rather, indeed, the contrary. Secondly, caution and experience suggest that the first of a series of tables should be held under more suspicion of possible inaccuracy than those which follow. The first Factory Census in 1835 was incomplete and defective; the earliest return of collieries (in 1854) similarly suggests incompleteness; and among census documents the fertility statistics of 1911 contain patent errors. Experience has its benefits here as elsewhere, and the accuracy of a second survey is often the product of the failings of the first.

These two considerations are obviously relevant when the results of the 1801 census are considered. The overseers might well have proved unequal even to the simple task of counting heads; but their conscientiousness and their intimate knowledge of their own localities seem to have carried them through. There was also, from the outset, a legal penalty for false returns. All the same, the ideal of a survey completed in a single day can hardly have been realized, and mistakes almost certainly occurred on this account. Errors of omission are likely to have been more frequent than those of commission. There was no parallel in Britain to the Irish situation of 1831, where enumerators in many districts acted under the not altogether unjustified impression that they were to be paid by results and in consequence swelled the total of their returns. There is no way of establishing the possible extent of inaccuracy in the general return of 1801, but a retrospective glance from the surer ground of the second half of the century, taken in the light of the evidence of Parish Registers and Bills of Mortality, would suggest the substantial accuracy of this first return. Caution might dictate the assumption of a possible maximum overall inaccuracy of 5%, but this would probably do less than justice to the enumerators of 1801.

The three succeeding censuses almost certainly contained deficiencies of a similar kind, though possibly of a less degree. The machinery, however, seems to have broken down completely at Newport, Mon., in 1821, for no return whatsoever was forthcoming from the rapidly growing Welsh borough. The advent of compulsory civil registration not only made possible a rough check of the accuracy of the returns but threw light on what was to prove a chronic problem of census-taking—the failure to secure a full return of young children. Even as late as 1911 the deficiency in the census records of children under 2 years of age would appear to have been over 6% of those of that age actually alive, and, although time has continued its remedial work, some 13,000 children (about 1%) failed to make their expected appearance on the census forms of 1931. Apart from this dwindling source of error, however, there would seem to be no reason to suspect the general accuracy of the population return.

Difficulties

The inquiries into housing and occupational status have been particularly provocative of problems of interpretation. Not until 1861 was it possible in the census return to make any distinction between the two-roomed cottage of rural England and the many-storied tenements of the great Scottish towns. There was consequent difficulty in making even a preliminary assessment of relative housing needs. Even to-day the census is too crude an instrument to give fully satisfactory information about this problem. Somewhat similar difficulties have been met in framing the questions on occupation. Since 1841 there has been an increasing refinement of the occupational schedule, bringing with it a more detailed and accurate return but tending to inhibit the making of some of those long-term comparisons on which the census can often throw great light.

No returns, however, have been more notoriously subject to error than those of the age distribution of the population. Old people tend to exaggerate their age; domestic servants hoping for a rise in remuneration have been said to practise a similar but more conscious deception: but these falsifications are trivial both in their manner and in their extent. More serious in its statistical consequences is the desire of young women to move too rapidly out of their teens or to linger too long in the twenties. Exhortation through the media of Press, radio, and cinema may do something to limit this type of inaccuracy; but human frailty is perhaps the most stubborn of all problems with which the statistician has to deal.

It would, of course, be possible to add to this list of sources of inaccuracy. The returns relating to marital status, for example, present problems similar to those arising out of the age question; and specialized inquiries such as the fertility census have their own difficulties. But the cases given should serve to illustrate the main sources of error as they reveal themselves in relation to the more general census inquiries. It would, however, be unjust to the Registrar's department to leave any impression that inaccuracy abounds. All the evidence points to a contrary verdict and suggests that, with each succeeding census, pockets of unreliability are being eliminated. The high standards established by Rickman and Farr have been more than maintained.

One further problem which has attended the taking of the census may here be noted—namely, the selection of the most suitable time of year for the inquiry. The criterion adopted has been that the day of the census should be that on which the maximum number of persons are in their normal place of habitation. Holiday periods and times of seasonal labour migration are therefore inappropriate: the early months of the year are also considered inadvisable because of weather

conditions. In practice, therefore, the census has always been taken at a date between the beginning of March and the end of June—and only twice in the latter month—and, of course, not at the Easter week-end. In 1801 the focal point of the census was made the midnight lying between Monday and Tuesday, March 9 and 10: since then it has without exception been the midnight between a Sunday and Monday. Even this careful selection of the most appropriate date has not satisfied the Registrar's department, however, and in recent censuses attempts have been made to determine the normal place of habitation and also the place of work of each person recorded in the schedule.

Uses of the Census

The forms of census inquiry have been largely determined by the uses to which census information has been put. The Defence Departments, the Ministries of Food and Agriculture, and the Ministry of National Insurance have fallen heir to those problems whose pressure gave rise to the taking of the first census; but every Government department must now look to the census as an essential part of the statistical foundation of its work. Especially perhaps is this true of the Ministries of Health and Labour—and of the Treasury. But the importance of the census extends far beyond governmental needs. Doctors, architects, actuaries, and insurance companies, among many varied professional groups, have their own particular interest in what each census reveals. No other body of statistical data will fully meet the needs which the census attempts to satisfy. Although inquiries through other agencies and methods have supplemented and in part superseded certain types of census inquiry, the regular decennial stock-taking, far from diminishing in importance, must grow in significance as the horizon of public concern and the duties of Government extend.

The person most generally interested in the results of census-taking is the demographer, the servant of all who come to make use of the enumeration and the examiner of the broad currents of population change: but equally catholic in his interests is the historian, the residuary legatee of all the material of the census and in many respects the richest and most permanent beneficiary of all.

For the economic and social historian there is no single source of evidence that throws so much light on the material conditions of a decade as does the census. The fullest of censuses, of course, covers only a sector of the economic life of a decade, but within its broad limits its richness of detail is unsurpassed.

Take, for example, the census of 1851, the year of the Great Exhibition, when Britain was at last becoming fully conscious of her economic strength and sought to assess the human roots of that power in statistical terms. In this census, with its recapitulatory tables of the five which preceded it, can be seen the growth of an agricultural into an industrial nation, its population doubled, and its new urban population increasingly concentrated on the coalfields.

Here can be seen the development of market towns and villages into industrial strongholds—first the increasing density of population in the old town as factories and back-to-back houses replaced cottage workshops and market squares; then, as building sites became exhausted, the steady encroachment of factory industry into the adjacent countryside; and, finally, the decline in population of the old central area as the answered need for warehouses, offices, and shops restored to it its old commercial character. Here, too, it is possible to trace how far house-building kept pace with the growth of population and to see the development of the nineteenth-century slum, more especially in London's crowded East End. In the Return from the country districts is seen the reverse side of the picture—decline in population, noted by the enumerators as due to the closing of a water-powered mill as the water-wheel gave way before the steam-engine or to the migration of handloom weavers driven out of employment by the competition of factory-woven cloth. In the farming areas, the growing dependence of Britain on foreign food supplies is indicated by a stagnant or declining population in many parishes. Elsewhere the rapid rise and fall of population marks the winning and exhaustion of the shallow coal-seams as the mining frontier was pushed steadily onward.

The table of birthplaces shows clearly the sources of labour supply for the new towns—the short-distance migration from countryside to town and the steady stream of the Irish into western industrial areas, a stream swollen by the famine of 1845. The occupational tables, with their list of some 540 occupations divided into 17 categories headed by the single entry "THE QUEEN," show both the wide persistence of handicraft industry and the quantitative importance of the small number of large-scale industries, an impression confirmed by the—unfortunately defective—tables of size of businesses which follow. Here also may be noted the still small number of black-coated workers and the vast army of domestic servants (almost 1 in 20 of the entire population of England and Wales).

There are tables—never reliable—of the permanently incapacitated, of age distribution, and of the size of farms; and information also about the problems of vagrancy and poverty which had bulked so large in discussions about the census a century before. Finally, for the study of this age of great literature and widespread illiteracy, of religious enthusiasm and frequent primitive violence, the educational and religious censuses are of particular interest. Here the curious may find that more children attended Sunday school than day school, that after the "three Rs" the most popular subject was geography, that there was no teaching of natural science or history and, for the boys, little of what would to-day be termed vocational subjects: here, too, the investigator will discover in terms of church-building how far the Anglican Church lagged behind its Nonconformist offshoots in supplying the spiritual needs of the new urban communities, but also how far those new town-dwellers fell behind their rural brethren in the duties of church attendance. But these are only scratchings from the top soil of the fertile territory which is open to the economic historian in the census.

The 1951 Census

The coming census has a peculiar interest because of the time gap by which it is separated from its predecessor. Particularly interesting will be the information it furnishes about the extent to which the war of 1939–45 has stimulated or retarded trends in the occupational and geographical mobility of labour and the influence which a greater expectation of life and a declining birth rate are exerting on the age-structure of the population. These are problems which must affect the nation's economic and social policies. There is, of course, already much

statistical information available about them, but precision will be given to the material on which social scientists are already working.

It is perhaps not possible to look to the results of the 1951 census with that same degree of uncertainty which must have whetted the appetite of the curious in 1801 and 1811, but to all who are interested in the material problems of our society the coming census will clearly have much to offer; and, if a conclusion may be made on a note of paradox, it is interesting to observe that, whereas the Britain of 1801 with its population of 11 millions sought statistical information on what it deemed to be its problems of over-population and an excessive birth rate, to-day, with a population more than four times as numerous, it is a low birth rate and a consequent reduction in population growth that causes most general concern.

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MEDICAL SIGNIFICANCE OF THE CENSUS

BY

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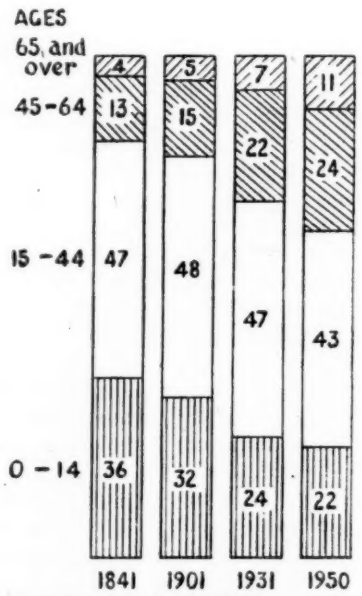
Although Moses, Joshua, Saul, Solomon, and Jehoram each succeeded uneventfully in numbering some or all of the people of Israel, King David was less fortunate, and his Satan-inspired venture in 1017 B.C. provoked Divine wrath and drew on Israel a three-day pestilence, "and there died of the people from Dan even to Beer-sheba seventy thousand men."[1]

Credit is claimed by Canada for the first census of modern times, a census of the Colony of New France in 1666.[2] The first complete census of a European country was held in Iceland in 1703,[3] followed by Sweden in 1749.[4] After a considerable amount of religious opposition had finally been overcome the first census in England was held in 1801. Since then there has been a census in this country every 10 years, with the exception of 1941. Despite the forebodings of our eighteenth-century legislators, no pestilences have resulted that can be attributed to these enumerations. On the contrary, by its contributions towards knowledge of the numbers of people and of the conditions under which they live, the census has played an important part in the prevention of disease.

Death and Sickness Rates

The first contribution that the census makes to workers in the medical field is to provide denominators for the various arithmetic indices—the sanitary indices—that measure the state of the public health. Often it is not enough to know the number of cases of illness or of deaths occurring in a community unless the number at risk is also known—usually the number of persons living in the community at the given time. This is not all, however; of almost equal importance to knowing the total numbers at risk is to know their sex and age distribution. Sickness and death rates of males differ from those of females, and rates for the young differ from those for the old. To compare the death rates, say in two towns, it is necessary to use some method of standardization to make allowance for sex and age differences in the two populations, and for this to be done it is necessary to know what these sex and age differences are.

Similarly, comparison of death rates between one year and another must involve some form of standardization if fallacious conclusions about the trends of health and sickness are to be avoided. It is well known that the population of this country has been ageing for some time past—that is to say, the proportion of young persons has been becoming less and the proportion of old persons more. This change has been the result partly of a more or less progressive fall in birth rates during the course of this century and partly because people live, on the average, several years longer now than ever before. Since old people, whatever their state of health, are normally more liable to die than young people, it follows that the more old people there are in the population the higher will be the crude—that is, unstandardized — death rate. As a result the crude death rate for England and Wales, which averaged 23.3 per 1,000 per annum in 1846–50 and had fallen to 12.1 by 1921–5, was still 11.8 in 1949. This does not indicate a slowing down of improvement in the nation's health, but just the opposite. When allowance is made for ageing of the population, the death rate in 1949 is found to have fallen by almost 30% compared with 1921–5.



Proportionate distribution of the population of England and Wales at ages 0–14, 15–44, 45–64, and 65 and over in 1841, 1901, 1931, and 1950. (The percentage of persons at each age is indicated within the Chart.)

The accompanying Chart shows the proportions of the population at different ages as revealed by the censuses of 1841, 1901, and 1931, and the estimated proportions in 1950. This year's census will show whether or not the estimates of proportions for 1950 have been good ones.

Since sickness rates as well as death rates tend to increase with advancing age,[5,6] it must also be expected that in an ageing population the crude sickness rate may be slow to fall or may even tend to increase despite a real improvement in health.

Life Tables and Expectation of Life

A further purpose that is served by accurate census information on the sex and age composition of the population is the construction of national life tables, and hence the calculation of the expectation of life. Although there are no longer the vigorous discussions on life-table principles and techniques that were a feature at gatherings of vital statisticians early this century, life tables still have important uses and will continue to be constructed. Early attempts to build up life tables, such as Halley's, could not be fully successful, since details of the population by sex and age were not known, and it has only been since the introduction of the census that life tables have been constructed accurately.

The expectation of life—that is, the average number of years that will be lived by a group of persons of given age subject to given mortality experience—is derived from the life table. The expectation of life in England and Wales has progressively increased according to the successive English Life Tables calculated after each census. Thus expectation of life at birth increased for males from 40 years in 1841 to 59 years in 1931, and for females from 42 to 63 years. *Approximate* expectations of life in 1949 were 66 years for males and 70.6 years for females.

Occupational Mortality

Among the most useful medical statistical studies that have been made in this country are the series of analyses of mortality in relation to occupation and social class, described by Greenwood as "the most valuable single instrument of socio-medical research our national armoury contains."[7] The twin bases of these occupational mortality analyses are: (1) the occupations of deceased persons as stated at the registration of death; and (2) the occupations of the living as stated on the census schedules. These analyses can be made only in and near the years when census information on the occupations of the living is available to provide denominators for the numbers of deaths. The pioneer work in this field has been done in this country, where occupational mortality analyses have been made in relation to each census from 1851. In the two most recent analyses, dealing with deaths in the periods 1921–3[8] and 1930–2,[9] the various occupations were grouped into a number of Social Classes—viz., I, Professional and Managerial; II, Intermediate between I and III; III, Skilled workers; IV, Intermediate between III and V; and V, Unskilled workers. Relative mortality of men in these Social Classes in 1921–3 and 1930–2 is shown in Table I, allowance being made for differences in the age structure of the groups.

TABLE I

	Social Classes					All Males Aged 20–65
	I	II	III	IV	V	
1921–3 ..	82	93	94	99	124	100
1930–2 ..	90	94	97	102	111	100

It will be interesting to see whether the analysis for 1950–2 will show further narrowing of the gap between Social Classes I and V.

In 1930–2 the occupation with the highest mortality of males was that of tin- and copper-mine workers below ground, with a mortality experience 242% above the average for all males. Medical practitioners had mortality rates 6% and coal-miners (all men engaged in coal-mining) 7% above the general average.

Deaths of males from angina pectoris and coronary disease showed a strong social class gradient in 1930–2 (Table II).

TABLE II

Social Classes					All Males Aged 35–65
I	II	III	IV	V	
237	148	95	66	67	100

Since 1930–2 the recorded mortality from coronary disease has increased tremendously, and when the deaths during 1950–2 can be tabulated it will be of considerable interest to learn whether the excess of mortality in the professional occupations still persists.

Deaths of married women during 1930–2 were analysed by occupation of husband. Since husbands and wives in general share the same socio-economic environment but differ in respect of occupation, it was thus possible to distinguish the adverse effects of socio-economic from occupational factors. It is intended to repeat this type of analysis with deaths during 1950–2.

Attention will also be paid once again to variations in infant mortality in relation to the father's occupation and social class. Previous analyses of this have revealed considerable disparity between the social classes. Table III shows the relative rates of mortality of legitimate infants dying under 1 year of age in 1921–3 and 1930–2.

TABLE III

	Social Class					All Classes
	I	II	III	IV	V	
1921–3 ..	48	70	97	113	123	100
1930–2 ..	53	73	94	108	125	100

Enumeration of Infirmities

At each of the English censuses during 1851–1911 questions were asked for the purpose of ascertaining the number of persons blind or deaf and dumb. In the absence previously of authentic information about their numbers, great disadvantages were said to have resulted "to those afflicted persons on whose behalf the appeals and efforts of philanthropy, unsupported by a reference to facts illustrative of their numbers and condition, have lost much of their intended effect."[10]

In 1851 one person in every 979 was returned as blind, and, according to Farr,[11] one of the most prolific causes of blindness in England was smallpox, which was responsible for more than one-sixth of the cases. At each census from 1871 to 1911 information was also obtained about the number of persons lunatic, imbecile, or feeble-minded. Questions about infirmities were not asked at the censuses of 1921 and 1931, since it had come to be recognized that the information elicited was unreliable.

Enumeration of the Sick

No attempt has been made at the English censuses to obtain direct information about prevalence of disease, but a notable incursion into this difficult and unexplored field was made at the census of Ireland in 1851. In the words of the Census Commissioners: "In making

arrangements for taking the census the subject of the diseases of the living occupied our attention, and preparations were accordingly made for procuring returns of all those persons who laboured under disease either at their homes or in public institutions upon the night of March 30, 1851."[12a] The purpose of the inquiry was thus described on the Sick Returns (schedules) that were used: "The alleviation of human suffering arising from bodily infirmity is a work in which every member of the community should naturally feel an interest; and one important step in this direction is to ascertain the extent and character of the evils to be contended with; towards these most desirable objects the Commissioners hope to assist by means of this Return."[12b]

The results of this pioneer inquiry, published in a volume entitled *Report on the Status of Disease*, might not, by modern standards, be regarded as giving very sound evidence upon the prevalence of disease; nevertheless the inquiry was not without value, and was repeated at each census of Ireland until 1911. Out of a total population of some 6½ million persons, 104,000, or 1 in 62½, were returned as "labouring under disease" on the chosen night; 9,000 of these in hospitals, asylums, and gaols, 47,000 in workhouses, and 48,000 in their own homes. One-third of the sick were returned as suffering from an infectious disease, one-quarter from disease of the nervous system, and one-tenth from respiratory disease including consumption. Circulatory disease was infrequent, afflicting only 0.5% of those sick. Coronary disease, of course, was not mentioned, but the following passage in connexion with the 266 cases of heart disease (out of over 6 million persons) reported by people in their own homes contains matter for pondering upon: "As, however, a diagnosis of cardiac affection could not well be made except by professional persons, and as the peasantry of Ireland popularly term several other affections chiefly of dyspeptic character 'diseases of the heart,' *from the distress experienced being, for the most part, referred to the precordial region*, we think it likely that the number returned as labouring under disease of the heart at their own homes is somewhat exaggerated."[12c]

Apart from blindness, deaf-mutism, and mental impairment, no attempt has been made at the censuses of England and Wales to ascertain the prevalence of disease, but, as has been emphasized earlier, the census enumeration of the population has been a necessity in order that the prevalence of disease, as determined by other methods, can be meaningfully related to the numbers at risk. The census, however, is more than an enumeration of the people by sex, age, and occupation. It is a periodic social survey embracing every individual in the country, determining not only the number but also the condition of the people in relation to their social environment, their homes, and their families. As such it not only provides the means for recording the results of medical progress in the past but also points out some of the directions in which further efforts are needed to achieve still greater progress in the future.

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SLEEP PROBLEMS IN THE FIRST THREE YEARS

BY

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The extreme frequency of sleep problems in young children might suggest that the abundance of material would have led to an extensive literature on the subject. A search, however, of the last 50 volumes of the *Index Medicus*, covering the world's literature of the past 25 years, revealed a mere 18 papers. Four of these were British and one was American. In contrast, the last 20 volumes of the *Index* listed 53 papers on lipochondrodystrophy (gargoylism). Only two of the ten papers which I was able to obtain gave practical hints of value in treatment—those by Wallgren (1937) and Spock (1949). Bakwin (1948) discussed the psychological aspect of sleep disorders.

Perusal of numerous volumes on child psychology showed that they too failed to discuss the practical management of a child with sleep refusal, Cameron (1946) and Kanner (1948) alone discussing the problem in detail. Cameron regarded the problem as one of the nervous highly strung child. Gesell and Ilg (1934), however, in an excellent discussion of the normal development of sleeping behaviour, emphasize that these sleep difficulties are not due to "nervousness" but that they arise in perfectly normal children, without any mismanagement, as part of the normal course of the evolution of their character and behaviour.

I have attempted to present the problem and to discuss those questions to which I do not know the answer, in the hope that others with more experience will be stimulated to put it into words and express their views.

Normal Sleep Patterns

This section is based on the work of Arnold Gesell, supplemented by my own experience.

Sleep problems are extremely common at one time or another in young children. The extent of the problem depends chiefly on two factors—the innate character of the child and his management by his parents. Few today believe that the character and the behaviour of a child are entirely engendered by his environment. The environment may modify but never completely change the character traits with which he is born. It is a mistake to suppose that sleep problems arise only as a result of mismanagement, spoiling, or unhappiness. Some particularly placid children present practically no problem. As infants they sleep a large part of the day in the "pram" with nothing to do, little to see, and without company. They are willing to be left in the pram long after the more active child has refused to have anything to do with it. A rigid bedtime schedule suits them well, while their more active determined brothers may not

tolerate absolute rigidity of method, demanding elasticity adapted to their needs. From a few weeks of life the more interested active child refuses to be left alone during the day, demanding to see everything that is going on, constantly wanting to practise his newly acquired skills of manipulation, sitting, standing, creeping, and walking. He requires very much less sleep than his more placid brother. He changes from two naps to one nap a day and then discards the daytime nap very much sooner. He has a great deal more determination and persistence, and in the resistive phase from 15 months to 3 years he has to be handled carefully to avoid sleep refusal.

The newborn baby sleeps for the greater part of the 24 hours, and it may be practically impossible to awaken him. As he matures, the duration and depth of his sleep decrease. At the age of 3 months the average child may have four or five sleep periods in the 24 hours. At 12 months he has two or three sleep periods, and at some time between 2 and 4 years he discards the daytime nap.

In the first few weeks of life the infant cannot help going to sleep, especially after a good feed. The older child, from 18 months onwards, finds it difficult to let himself fall asleep, sleep release having become largely a voluntary process, and sleep resistance may therefore develop. Between 9 and 21 months the child is particularly apt to suck his fingers when going to sleep, and head-rolling or head-banging is apt to occur. They disappear in time without treatment.

A young baby who is constantly rocked to sleep may associate rocking with sleep and later refuse to sleep without rocking. An infant learns to associate sleep with a particular doll, teddy bear, or rag, so that he becomes unable to go to sleep without it. At about 2½ the child is apt to develop a sleep ritual, demanding a drink, the pot, and other things before he will go to sleep, and often demanding his mother's continued presence. This is a form of filibustering, but it is also a kind of association between sleep and other objects or acts, as in the younger child.

Another aspect of development which has considerable bearing on the sleep problem is the normal period of development of the ego between 1 and 3 years. A child at this age is a nonconformist. Gesell terms it the "period of disequilibrium." He wants to assert his powers and attract attention. He likes a fuss and a display of parental anxiety. He enjoys a fight, particularly as a fight almost always ends in victory for him. He is extremely likely to repeat any performance which causes such a response, and so readily develops bad habits. If offered one toy he wants a different one. If asked to go out he wants to stay in. He demands to go upstairs when his mother goes down, to turn left when she turns right, to sit down when she wants him to walk. Whatever she wants him to do he wants to do the opposite. If she tries to persuade him to eat more food, and certainly if she tries to force him, he will develop the commonest of all behaviour problems—food refusal. If she tries to compel him to sit on the pot against his will until he has passed urine or faeces, he will rebel against the pot, sphincter control will be delayed, and constipation may result.

It is not surprising that the same traits pervade his sleep behaviour. He can maintain surprisingly prolonged opposition to bed and sleep if the parent tries forcible methods of compelling him to lie down or sleep, makes a fuss, and displays anxiety. It is a great mistake to regard this as due to naughtiness or nervousness. It is part of his normal development. Marked negativism and determination in the absence of mismanagement is likely to be a preview of strength of mind and qualities of leadership in an adult. Such character traits must not be broken or cowed.

The risk of habit formation is a vital one in the consideration of sleep problems. It is difficult to say when it begins. It is present at 6 months of age, and often earlier. Spock (1949) describes the frequency with which sleep refusal dates from colic in the first three months, for which the child had to be picked up in the evenings, when colic is most likely to occur. The baby then develops the habit of crying to be picked up when placed in its cot. The risk increases with the increasing maturity of the child. At the age of 2 to 3 a child very rapidly develops habits, good or bad, and every effort must be made to avoid the development of bad ones.

Another relevant phase of development is the increased dependence on the parents between the ages of 18 months and 3 years, a greater reluctance to be left alone or to be left with anyone but the parents. The intensity of this trait depends partly on the nature of the child. The more affectionate and sociable he is the more he demands his mother's company. Crying in any part of the night or morning may be largely due to this. The basic needs of the child are love and security, and every effort must be made to supply them.

Between 2½ and 4 years of age children commonly develop inexplicable fears, such as fear of the dark.

It is important to remember that the normal child acquires sphincter control between the ages of 15 months and 3 years. Most children become dry by night between the ages of 2 and 3, and they may wake crying at night because they want to pass urine. Failure to answer the child's needs is extremely likely to delay the acquisition of sphincter control. Such crying is apt to be wrongly ascribed to naughtiness.

In the first two or three years it is wise in cold weather to look in on the child when asleep to make sure that he is properly covered up. Shortly after the second birthday he discovers how to cover himself up in bed. The mother has to get used to the sight of the child lying asleep in extraordinary positions, transversely across the bed, or with his feet, instead of his head, on the pillow.

The best guide to the adequacy of sleep is lack of fatigue during the day. There are considerable variations in the amount of sleep required by children, and, provided that no undue fatigue results in the daytime, it does not matter in the least if the child lies awake for two or three hours (without crying) after going to bed, or awakens at 1 or 2 a.m. and talks and sings, or awakens at 5 a.m. to talk, sing, or play with a sibling. Nor does it matter if he temporarily goes to bed later than his usual bedtime. The rhythm of sleep varies greatly from child to child and from time to time in the same child.

The difficulty experienced by the toddler on waking from a nap, and the crying and irritability which often result from wakening him too suddenly, are of no importance.

Preparing for Sleep

The first essential is intelligent management of the child based on love and a thorough understanding of the normal.

Full realization of the child's normal negativism between 15 months and 3 years is essential. Much trouble can be avoided by adoption of a wise pre-bed routine. It is a good thing for the child to get used to the idea that he goes to bed after some books have been read to him. The stories should not be too exciting. Every effort should be made to avoid snatching toys from him in impatience or anger because he is slow to put them down or away. He should not have too exciting a game before he goes to bed. It is important to avoid tears and arguments at any stage in a child who is apt to cause trouble when put to bed. If the child will not set off upstairs on his own after waving "bye-bye" he should be led or carried up, but there should be no discussion about whether it is time for him to go. He should be allowed to help in the preparation for the bath —undressing, turning on the tap, throwing the sponge into the bath. A child who is learning the use of his hands may be very annoyed if he is not allowed to take part in undressing and putting the nightie on. Almost all children enjoy the bath, and this should be encouraged. He can splash, "swim," and help to wash himself. If he wishes he should walk to bed instead of being carried.

To the adult these may seem to be trivial matters, but if they are ignored because the mother is in a hurry, is impatient, or is irritable, the child may respond by tears, and if he is in a resistive phase this may be quite enough to make him refuse bed. In winter the bed should be warmed by a bottle, which is removed when the child is put in. He should find his favourite doll awaiting him. Particularly in his second and third years, he likes to have a variety of toys in bed with him—his favourite tin with dried peas in it, the coloured clothes-pegs, and books. It is no use expecting the bed to be neat and tidy. He may dislike being tucked in excessively, and if so it can be avoided. The room should be properly darkened, unless he is afraid of the dark, in which case there is no harm in supplying a night-light, for it would be foolish and cruel to leave him crying for fear in a totally darkened room. The room must be properly ventilated and not stuffy, and overclothing must be avoided.

He should be put into bed with an air of certainty and confidence. It is disastrous to show doubt or anxiety whether he will lie down. The child is extraordinarily prompt to recognize such doubts and to take advantage of them. He must not be told to go to sleep, or to be a good boy and not to cry. That is a certain way of keeping him awake.

The mother and father should, if possible, share in putting the child to bed. The child who has never been bathed and put to bed by anyone but his mother may very well cause a disturbance when someone else has to do it.

All threats to use bed as punishment must be avoided, for a child readily develops unpleasant associations with bed. All conversation about his appalling bedtime behaviour must be absolutely avoided in his presence, for it merely focuses attention on the problem. One has only to listen to the toddler's conversation with his dolls during a phase of sleep resistance to realize how much the child thinks of his night-time experiences, and further attention must not be drawn to them.

Most people advocate absolute rigidity about bedtime. The desirability of this is a matter of opinion. It may be reasonable in later years of childhood, but it is doubtful whether it is always right in the difficult age of from 1 to 3. Rigid bedtime schedules, like rigid feeding schedules, suit many children, but not others. A determined child in the resistant phase is very apt to cause trouble if put to bed before he is tired, and some elasticity would seem desirable in his management, his bedtime being postponed a little until reasonable fatigue indicates his readiness for bed. Clearly overfatigue must be avoided, for excessive tiredness may cause restlessness and delay sleep.

Many make the mistake of giving the child too long an afternoon nap. A child of 2 who has a three-hour nap in the early afternoon cannot be expected to be tired or ready for bed at 6 p.m. The best course is to shorten the afternoon nap. The only alternative would be to postpone his bedtime to a correspondingly later hour The transition stage between two sleep periods and one sleep period in the 24 hours is difficult to manage. If he has the afternoon nap he is not ready for sleep at the usual time in the evening, and may refuse to go to bed. If he refuses the nap he is unduly tired and bad-tempered in the late afternoon. Adjustment occurs as he gets older so long as elasticity is allowed and no forcing methods are adopted. When he refuses to go to bed in the afternon he may be perfectly willing to sleep on the sofa, or on blankets placed on the floor elsewhere but in the bedroom, provided that no mention is made of the abominated words "sleep" or "rest."

An essential prophylactic measure is the avoidance of tension and fights during the day. They set up a vicious circle—tension and temper tantrums leading in turn to increased irritability and tension by day. The resultant tension in the mother, together with the child's disturbed nights, keep the mother awake, and her irritability next day considerably worsens the child's behaviour. The child who during the day receives all the love and security which he needs, and who is subjected to wise discipline with a minimum of thwarting, is unlikely to present anything but temporary problems at night. The child who sees little of his mother by day because she is working in industry or goes out shopping and visiting friends without him may be very reluctant to leave her at night. Persistent sleep problems are usually only part of a general disturbance of behaviour due to mismanagement.

A common cause of the mother's anxiety is the proximity of neighbours, or the presence in the house of a critical mother-in-law. This is a social problem for which it is difficult to find the answer, but the mother must be led to understand that her efforts to make the child go to bed and sleep are having the reverse of the effect desired. There is no better preparation for a good night's sleep than physical exercise in the open air.

Sleep Problems

When sleep problems arise, the essential thing is to do one's best to discover the cause, trying to see things from the child's point of view as well as from that of the parents. Many parents complain that "they have had a bad night with their child." Others complain that "their child has had a bad night." Both the child's and the parents' points of view must be considered. Every effort must be made to discover the reason for possible underlying tension. In the period of negativism the most trivial things may upset the child and cause bed refusal. Teething, a slight cold, a change of room, a change from a cot to a bed, may be enough to cause temporary trouble. In many cases the cause remains undiscovered.

Children have phases for which no explanation can be found. Properly managed, these phases do not last long; badly managed, they readily persist. It is essential that the parents should lose any sense of guilt of having failed the child by mismanaging it, or of anxiety about his mental state or happiness. They must realize that his behaviour is not just naughtiness. They must be told about the normal development of the child so that their anxieties may be allayed. It may be necessary to treat the mother with a sedative, such as phenobarbitone, to break the vicious circle mentioned above. They must not think that these problems arise only in the nervous child, as Cameron (1946) suggests. The parents must know what is normal and be guided accordingly, so that the child rapidly grows out of his difficulties.

For convenience the following discussion is divided into four parts—bed refusal, sleep refusal, night waking, and early morning waking. A child may show any of these alone or in combination. One problem often leads to another.

Bed Refusal

The child may either cry and scream when taken to bed or lie down quietly and get out of bed and cry as soon as the parent's back is turned. The "crying" often begins as mere shouting, and without tears. It is of necessity not a problem of the first year of life. It occurs particularly in the period of negativism from 15 months to 3 years.

There is no one method which will cure the problem. Provided that the child is reasonably fatigued the trouble is likely to be in the main an attention-getting mechanism, a way of asserting his power, together with his desire for company. I was asked to see a child of 17 months because the mother feared that he had gone wrong in his head. When she had put him to bed and gone downstairs he immediately began to cry, and every time she went back to him he was standing on his head. Fear of the dark and of strange shadows on the wall may cause trouble in the older child. In other cases no cause can be found.

The chief essential in the management of the problem is to avoid having a fight with the child, for in a fight over any matter, day or night, the child almost invariably wins. It is futile to compel a child time after time to lie down. Once such a scene has occurred it is very likely to recur, the child expecting the fun and being fully prepared to demonstrate his powers. If he refuses to stay in bed and lie down it is wise to talk to him, tell him some nursery rhymes, and quietly but firmly try again. If he refuses again, he should be left to get out of bed and find his own way back. If there is a danger that he will climb out of his cot (at about 2 years) he should graduate to a bed. When he discovers how to open the door (between 2 and 3 years), it will have to be locked or have a catch on it so that he cannot get out and perhaps fall downstairs. It is thoroughly undesirable, however, except during this short period and under these circumstances, to lock a child in his room. Above all, no anxiety must be shown about his behaviour. The mother must convince the child that she does not care if he does not lie down. It is futile to argue with him. He will almost inevitably do the opposite of what he is asked to do. It is disastrous to lose one's temper or become impatient or cross. The worst thing that the mother can do is to smack him. The child wants love, and love and patience alone will soothe him. It is stupid to smack a child for wanting the company of the parents he loves.

He should not be left crying at the door of his room indefinitely. Just how long he should be left in an attempt to break the habit it is difficult to say. Some claim that any child will yield if left to cry it out for two or three consecutive days. It might even take longer to break a well-established habit. It is not easy to persuade a loving mother to adopt such a course, but she may be persuaded if brought to realize that it is in the child's own interest. The mother or father should certainly go in at not too frequent intervals, and only for a minute or two at a time, to see that no ill has befallen him and to try to soothe him. If they stay longer the child will again cry for their return. If he is apparently not tired, it may be right to take him downstairs for a while, but clearly this should be done only very occasionally, for it very rapidly leads to habit formation.

Whatever is done, it is essential to be consistent, using only one method at a time, until an adequate period has elapsed for its effectiveness to be assessed. It would be wrong, for instance, to sit with the child until he goes to sleep on one night, on the next to leave him to cry it out, and on the next to take him downstairs the moment he cries.

Occasionally a child refuses to go to bed for his mother, but lies down meekly for his father or someone else. This is only a temporary phase if properly managed. If he expects a fight with either parent the best thing is to let the other parent put him to bed for several nights, and then let the first try again with an air of confidence and certainty.

Wallgren (1937) suggests a change of surroundings in severe cases—placing the bed in a different position or in a different room.

Sleep Refusal

Sleep refusal is essentially the same. An infant only a few months old may show surprising resistance to sleep, and at the age of 2 or 3 a child can resist sleep for two or three hours, even though tired. As with bed refusal, the first essential is to determine the cause. In an infant it may be hunger, thirst, wind, inability to move arms or legs because of the bedclothes, a wet nappie or a napkin rash, overclothing, teething, or loneliness. In an older child the causes are the same as those of bed refusal, to which it is closely related. If he lies awake without crying no treatment is necessary, because it is harmless.

In the first year of life it is rarely justifiable to leave him to cry it out. The infant only cries himself into a state of hysteria, and the longer he is left the more difficult it is to soothe him, for he continues to cry a long time after being picked up. The crying then gradually stops, but the jerky respirations of sobbing persist much longer. The longer he is left to cry the more likely he is to do it again on subsequent nights. If, however, the infant has developed a habit of sleep refusal, through frequent picking up as a result of colic in earlier weeks, the habit must be broken by leaving him to cry—at least for half an hour or so. It must be remembered, when this is done, that even a small baby can make himself vomit by crying, and it is no use leaving him if he is becoming hysterical.

Though it is impossible to prove that persistent crying day after day has a deleterious influence on his psychological development, it is at least reasonable to suppose that it would have. All would agree that discipline is essential to his upbringing, and that no child should have

all his own way. The mother, however, may be unable to discover what the child wants, and may form a wrong conclusion that his crying is mere naughtiness, while the child knows perfectly well that what he wants is love. It is disastrous to try to compel him to do without it. It is a very common practice for parents to leave a child crying for fear of spoiling him, because they have read about the evil results of "overstimulation." This is always wrong. No mother spoils her child by giving him love and by picking him up when he feels lonely.

There is no harm in singing or rocking an infant to sleep on occasion, provided it is not done so often that habit formation occurs, and the child gets to associate sleep with singing and rocking and is therefore unable to go to sleep without it. It is a matter of opinion whether it is right in a difficult phase for the mother to stay in the room with the child until he falls asleep. If she does, she should not talk to him, and it certainly should not be allowed to become a habit, as it rapidly will. It is always wrong to stay in the room and play games with the child, read to him, and adopt other measures to make him go to sleep. I recently saw a child who was being held down by all four limbs so that he would go to sleep. Another common practice is to lie down at the side of the child until he goes to sleep, or else to take him into the parents' bed. Both practices are bad ones, because they inevitably cause habit formation.

The more complicated sleep rituals of the 2½-year-old child have already been mentioned. The danger is that the child will keep adding to the ritual. First he demands a drink before he will go to sleep; then he demands to be placed on the pot; then a few days later he demands a drink after the pot; and so a complicated ritual is allowed to develop. Once developed, it is difficult to break; but it must be broken, even though a sedative drug has to be given to help in the process.

A common cause of the child's sleep refusal is the constant visiting of the overanxious mother, who looks in on her child every few minutes to see if he is asleep. Her anxiety is largely due to a wrong idea of the child's sleep requirements, of the individual variations in the amount of sleep actually taken by normal children. She does not realize how normal it is for a child to lie awake for an hour or two after going to bed. The child expects the visits and so deliberately stays awake and may cry for his mother. If he lies awake without crying he should be left strictly alone, for it is normal behaviour, and there is no need to do anything about it. It is perfectly legitimate for the mother to look in on the child in cold weather after he has gone to sleep, to ensure that he is reasonably covered up.

Many parents are reduced to giving their children drugs to make them sleep. Drugs should be used only as a last resort, and for a particular reason such as the breaking of an especially difficult habit due to mismanagement. They should never be given for more than a few days. It is useless to treat the sleep refusal without treating its cause, for this merely evades the issue. Drugs are useful to help break the vicious circle of sleeplessness leading to irritability, exaggerated negativism, and sleep refusal. Drugs should be given, not after resistance has occurred, but to prevent resistance and to get the child out of the habit. They should therefore be given at bathtime. A safe and convenient drug to use is chloral, in a dose of 2 gr. (0.13 g.) at 1 year, or 4 gr. (0.26 g.) at 3 years. The regular use of drugs is an admission of defeat, a confession of one's inability to handle the problem.

Waking at Night

The problem of night waking is in some ways rather different. In the first six or eight weeks of life the average baby wakes up for two feeds. Very many mothers, on instruction from nurses and doctors, refuse these on the grounds that it will "spoil" the child and lead to habit formation. It does no such thing. By three or four weeks the average child drops one of these two feeds, and by six to twelve weeks drops the other and sleeps through the night. Refusal to give these feeds inevitably causes prolonged crying.

In most ways the causes of night waking are similar to those which cause sleep refusal. After the first ten weeks the infant who is given enough food by day rarely wakes as a result of hunger, but he may wake from thirst in hot weather. The older child, like adults, is apt to sleep badly on a hot night. More often the infant wakes up as a result of a wet napkin. He may be disturbed by a painful tooth, and require consolation. After the age of 3 months or so children often wake with a sudden scream, as if they have had a bad dream or nightmare. It is found that the nappie is dry, and there seems to be no obvious explanation. Other children have phases of night waking for which no explanation is discoverable. When properly managed those phases disappear in a few days. The child of 2 to 3 years very commonly wakes and sings or talks. There is no need to go and see him or do anything about it, for it is a normal and harmless practice. The child who goes to bed early, or who has too long an afternoon nap, or who goes to sleep immediately he is put to bed and sleeps throughout the evening, is particularly liable to wake up during the night.

Between the ages of 2 and 3 most children acquire sphincter control at night. The only method they have of announcing their desire to pass urine is to cry. Once awakened and given the opportunity of passing urine they may cry again for company. Such waking may sometimes be prevented by lifting the child out to pass urine when the parents go to bed. There is little point in regularly lifting a child out at night before he shows signs that he is acquiring sphincter control.

Another common cause of night waking is disturbance by parents sleeping in the same room. The older the child the less sound is his sleep likely to be, and he is readily awakened by his parents' snoring, coughing, talking, or turning over in bed and making the springs squeak. He knows his parents are there, and so cries for them. Furthermore, the mother, hearing her child wake, gets up to look at him, and so he cries when she leaves him. If he had been in another room his waking would not have been known to the mother, and she would not therefore have gone to see him. He would then have probably gone off to sleep without crying. Every effort should be made to let the child sleep away from his parents after the first few weeks, even if the cot has to be transferred from the only bedroom to the kitchen when the parents go to bed.

It is unwise to leave the child crying when he wakes up. It has already been pointed out that the longer the child is left crying the longer it takes to stop him when finally the mother goes in to see him. The wise parent who goes in to see the child immediately after crying starts, especially after the first 18 months, is likely to

find that she needs to stay in his room for only a minute or two to calm him so that he goes to sleep. He seems to be afraid, and her presence immediately quiets him and gives him a feeling of security.

It is important to remember that sudden crying may be due to the child's being in difficulty owing to strangling by a cord round the neck, to vomiting, or to an acute illness, such as an inflamed throat or ear. Some children vomit through excessive crying. Persistent failure to help a child who has reached the stage of acquiring sphincter control, and is crying because he wants to pass urine, will seriously delay control. It is essential, therefore, to go in and see the child and determine the cause of his crying. The napkin should be changed if necessary, and the older child may be given a drink, but he should be left as soon as he has quieted. It may be necessary to sing the younger child to sleep. It is unwise to take the older child into the parents' bed, for reasons stated. Some children who go to bed tired out show an astonishing faculty of recuperation after a mere hour's nap, and it may be desirable on occasion to take such a child downstairs for a while, there to stay until he gets reasonably tired. If this is done on odd nights only, habit formation will not develop. If it is often repeated a habit will rapidly develop which it will be difficult to break. Anger, impatience, and rough handling seriously disturb the child who is wanting nothing but love, and they do nothing but harm. It is not easy to avoid showing anger when the child wakes and cries at a particularly inconvenient time, such as a dinner party, or when the parents are going out to a theatre.

A very difficult problem arises when the child wakes up in the middle of the night and refuses to settle when put back to bed, or settles for a few minutes and then cries again for the parents. The problem is apt to arise in the child who habitually wakes early in the morning, at 5 or 6 o'clock, and demands company, being taken as a result into the parents' room. Such a child cannot distinguish 3 a.m. from 6 a.m., and he cannot understand why he is taken into the parents' room at one time and not at another. I do not know the answer to the problem. I certainly think that the parent should try a second time to quiet him and perhaps a third time, but the process cannot be repeated indefinitely. Love and patience do not always win. I recently saw a child who had his mother going in to see him 12 to 15 times every night after midnight. This habit must be broken. It is difficult to agree with many psychologists who say that the child should never be left to cry it out. I feel that he must be left. It is unusual for such a child to cry prolongedly, and certainly prolonged crying on more than two or three nights must be avoided. Each case must be decided on its merits. A scheme which will work in one child will not work in another.

Early Morning Waking

In the infant this usually presents no difficulty. It is particularly common in the first eight weeks, and as a rule is due to hunger, which is easily allayed by a feed.

The common age at which early morning waking occurs is from 2 to 5 years. The child wakes up at any time after 4 a.m. quite rested, and feels full of life. If he does not cry, but lies awake reading his books or playing, then no treatment is necessary. Up to the age of 2, children who wake early often play quietly without crying. In the stage of increased dependence on the parents, after the age of 2, they are apt to cry for company. The problem hardly arises when there are two or more children over the age of 2, for they can play together. The child should be given plenty of toys and books in the room, in the hope that he will play quietly with them when he wakes. Between the ages of 2 and 3 waking in the early morning is very apt to cause the child to be unduly tired during the day, but this will be largely avoided if he still has his afternoon nap. It is essential for parents to recognize the normality of this behaviour, but that is only slight solace to the weary parent who longs for sleep while his offspring is overflowing with energy.

It is often futile merely to change the nappie, put the child on the pot, and give a drink, thereafter leaving him —though this should certainly be tried in the first place. He wants company, and, feeling wide awake, will not be left alone. It is one matter to leave the tired child to cry it out, and another to leave a child when wide awake. He is likely to go on crying until the parents get up themselves, and if left in this way he is apt to develop such a distaste for bed and bedroom that he refuses to go to bed at night. It is often necessary to allow the child into the parents' room. It is a common practice to take him into the parents' bed, but many children feel so energetic at this time that they are unwilling to stay there. In either case it is bound to become a habit, but there seems to be no alternative. The child is delighted to be with his parents, and he is quite unable to understand why his parents are not equally delighted to see him. It is impossible to explain to him that they are worn out by his behaviour. I do not know any answer to the problem. Adjustment of the time of going to bed does not seem to help. Lifting the child out late at night to pass urine may postpone his time of waking. One can only hope that he will wake later when the capacity of the bladder increases, and that the phase of early waking will be a short one.

Conclusion

Enough has been said to indicate the difficulties and complexities of the problem. He who says that he knows all the answers, or suggests that one particular method is infallible, has little experience of children. No one method suits all children. The placid easygoing child presents no difficulty. The active determined child may tax one's ingenuity to the utmost; and each child, each phase, may demand its own special treatment.

It is not enough merely to instruct the parents to discipline the child, to put him to bed at a fixed time, and, if he objects, to leave him to cry or to drug him. The treatment of sleep problems is not nearly so simple. It is essential to treat the attitudes of the parents and to remove their anxieties. They must be given more understanding of their child, of the way in which the child's mind works, and of the stages of development through which children pass. This necessarily involves the taking of a most careful history of the management of the child not only at night but in the daytime as well.

There is little doubt that the more love and security the child receives during the day, the wiser the parental management, and the nearer the mother's patience approaches that of Job, the less likely it is that the child will be awkward at night. The essential thing at night is to give the child love and security, to avoid a fight at all costs, to be entirely consistent, to prevent the formation of bad habits, and to break those which have already formed. The child must be handled tactfully and lovingly, with full understanding of his needs,

without ever losing one's patience or temper. The problem is not then likely to be long-lasting. It will disappear—only to be replaced by a completely different problem which, one hopes, will be more easy of solution.

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TREATMENT OF HYDROFLUORIC ACID BURNS

BY

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Burns caused by hydrofluoric acid are largely confined to workers in special industries, and it is unusual for a case to appear in a burns unit which is not near an industrial area. Knowledge of hydrofluoric acid burns, and their treatment, thus tends to be restricted to industrial medical officers. Nearly all the work published on the subject has appeared in industrial medical journals, and little in the more widely read medical press. The effects of such burns, however, are of so peculiar a severity that it may be worth while to give an account here of my own experience of a single case, and in that connexion to discuss what is known of their nature and their treatment.

Chemistry of Hydrofluoric Acid

Hydrofluoric acid is an inorganic compound of hydrogen and the element fluorine. Fluorine occurs in nature as fluorspar (Derbyshire spar, blue-john), which is a crystalline fluoride of calcium. Agricola described it in 1530 and named it "fluor," from the Latin verb "to flow," as it melts at red heat. The crystals exhibit a bluish glow when light falls upon them. This effect has led to the more general description of the phenomenon as "fluorescence."

Crude hydofluoric acid was first prepared about 1720 by an unknown English glass-worker. Priestley and Scheele in 1771 discovered that fluorspar was a salt of lime and a peculiar acid. They distilled fluorspar with strong sulphuric acid in a glass vessel, and obtained a vapour which corroded the flask. Meyer in 1781 and Wenzel in 1783 distilled fluorspar with strong sulphuric acid in iron and lead vessels, and obtained what must have been fairly pure hydrofluoric acid. Ampère in 1810 was the first to suggest that the acid was a compound of hydrogen with an unknown element, which he called "fluorine." Fluorine itself, a member of the halogen group of elements, was first isolated by Moissan in 1886 by electrolysis of potassium fluoride in an excess of anhydrous HF.

Hydrofluoric acid is chemically a weak acid; its degree of dissociation is small compared with that of the strong mineral acids; but its power to attack silica and silicates makes it of great industrial importance.

The fluorides, or salts of hydrofluoric acid, differ strikingly from the salts of the other halogens. Whereas silver bromide and silver chloride are very insoluble, silver fluoride dissolves readily in water. On the other hand, calcium fluoride and magnesium fluoride are insoluble salts, and this fact plays a vital part in the treatment of fluoride toxaemia and hydrofluoric acid burns. Fluorides also tend to form complex compounds such as silicofluorides and fluoraluminates. Sodium fluoraluminate, or cryolite, is important in the extraction of aluminium from the ore (Partington, 1946).

Hydrofluoric Acid in Industry

Hydrofluoric acid has many uses in industry. Its capacity to dissolve silica is used (1) in foundries, for removing sand from castings; (2) in glass works, for etching and frosting glass and removing tool marks from cut glass; (3) in the pottery and china industries, for removing spots in the glaze; (4) in the graphite industry, for removing siliceous impurities; (5) in the manufacture of ashless filter paper. In breweries it is used for cleaning pipes, as it destroys yeasts and thus restrains secondary fermentation. It is used as a bleaching agent in the manufacture of cane chair-seats. Hydrofluoric acid fumes are given off in the manufacture of superphosphates for fertilizers.

Toxicity of Fluorine Compounds

The toxic actions of fluorine compounds fall into three groups—acute poisoning, chronic poisoning, and local effects. Acute and chronic poisoning have been reviewed extensively by Roholm (1937), Greenwood (1940), and others. The present paper is concerned with the local effects. A few fatal cases of fluoride burns have been reported, but in these there was no evidence of fluoride absorption.

Many fluorine compounds have corrosive action on the skin. The HF molecule would appear to be the active agent, and any acid-reacting solution of fluorides, bifluorides, or fluosilicates is corrosive (Roholm, 1937). Most of the published cases of burns are due to hydrofluoric acid itself.

Hydrofluoric Acid Burns

Ever since its discovery hydrofluoric acid has been known to cause deep, slow-healing, painful burns. Lesions may be produced by exposure to the acid vapour or to its aqueous solution in various strengths. Repeated exposure to the vapour may lead to ulceration of nasal and oral mucosa, bronchopneumonia, and oedema of the lungs; there may be conjunctivitis; the cuticles may be attacked, causing suppuration and loss of the finger-nails (Eulenburg, 1876; quoted by Prosser White, 1934). The concentrated vapour may burn the skin (Schuermann, 1937).

The aqueous solution causes burns, the severity of which depends on the strength of the solution and the length of time it is in contact with the tissues. One outstanding feature of burns by hydrofluoric acid is the excruciating pain which they cause. When the acid is in weak solution the onset of pain may be delayed for an hour or more. A burn from anhydrous hydrofluoric acid is felt immediately (Gehrmann, 1948).

Exposure of the skin for a minute or two to a weak solution of the acid, or momentarily to a strong solution, produces a blanched slightly oedematous weal, with subsequent crust formation in about four days. The crust separates in a week, when the subjacent area will be found to have healed (Paley and Seifter, 1941; Gehrmann, 1948; Thelwall Jones, 1939).

In more severe burns there is a greyish-purple discoloration of the skin with a surrounding red, oedematous area. Blisters containing sero-purulent fluid are raised on the skin. Beneath the skin there is deep destruction of tissue, which is responsible for slow-healing ulcers. It appears that the horny layer of the skin acts as a barrier to the weaker solutions, but once this barrier has been passed, though the skin is not dissolved, the necrosis of tissue beneath is surprisingly extensive (Fredenhagen and Wellmann, 1932).

Thelwall Jones (1939) reported a series of twelve cases. In these he drew attention to the following outstanding points: (1) the intense pain of the burn, which may be delayed for several hours, but which in the absence of treatment may persist for several days; (2) the tough coagulated area of skin at the site of the burning; (3) the progressive destruction of tissue beneath the skin, which may continue over a period of several days.

According to Roholm (1937), as stated above, the active agent is the intact HF molecule, which is capable of penetrating intact epidermis.

Treatment

The various treatments which have been suggested for hydrofluoric acid burns are based on three principles: (1) dilution and washing away of the acid; (2) neutralization of the acid with weak alkalis; (3) precipitation of the acid as insoluble fluoride. A pamphlet issued by the National Council of the Pottery Industry recommended washing under running water. This was to be followed by immersion for one minute in weak ammonium carbonate solution. The area was then to be washed in water and re-immersed in ammonia, the process being continued for about ten minutes. The use of ammonia has the disadvantage that the ammonium fluoride formed breaks down to ammonium bifluoride, which itself is corrosive.

Ziener (1935) recommended immersion in a saturated solution of sodium bicarbonate. Schlick (1911) showed experimentally that the toxic action of sodium fluoride was neutralized by the simultaneous administration of calcium chloride.

Fredenhagen and Wellmann (1932) treated hydrofluoric acid burns of the hand by massaging a cream of magnesium oxide and glycerin into the surface of the burn. The paste was reapplied frequently and kept in contact with the burn for several hours. They tried the injection of a 20% solution of magnesium sulphate into the burned tissue, and reported one successful case. They suggested, on theoretical grounds, that a 10% solution of calcium gluconate would be a better agent to inject, though its action would be slower. Schuermann (1937) tried the injection of 10% calcium gluconate solution in a case of burning by the vapour of hydrofluoric acid. He gave it intravenously, however, and reported it to be without benefit. Thelwall Jones (1939) reported success with the injection of calcium gluconate into and under the coagulum of the burn. Paley and Seifter (1941), who carried out a series of controlled experimental hydrofluoric acid burns in rats, reported beneficial results from the injection of calcium gluconate into and under the burn.

Thelwall Jones (1939) drew up a scheme of treatment. This is now the basis of the emergency treatment of burns in many factories where the acid is in use. The main points in this scheme are: (1) emphasis is laid on the need for immediate treatment as soon as the burn occurs; (2) the burned part is immediately washed or immersed in a warm saturated solution of sodium bicarbonate; (3) after the washing a cream of magnesium oxide and glycerin is massaged into the surface of the burn; (4) *as soon as possible* a 10% solution of calcium gluconate is injected into and under the coagulum of the burn; further dressings of magnesium oxide cream are then applied, being renewed night and morning for five to six days.

The injections of calcium gluconate are given in the hope that fluoride in the tissues will be inactivated by precipitation as insoluble calcium fluoride. It is uncertain whether such a simple chemical reaction actually occurs in the tissues, but the injection gives immediate relief of pain when adequately carried out, and prevents the extensive necrosis seen in untreated cases (A. Lloyd Potter, personal communication). Gehrmann (1948) points out that the lesions of finger-tips and nail-beds are particularly painful, and that local analgesia is necessary to allow the injection of calcium gluconate to be given. The nails can then be opened to release tension. He also recommends soaking of the burned part in 70% alcohol and ice. This is believed to close lymph channels and retard penetration of the acid beneath the horny layers of the skin. It relieves pain and may promote diffusion of fluorides from the tissues into the alcohol.

Case Report

The patient was a woman employed in the manufacture of glass measuring-tubes. On these she etched the graduations, using a 60% aqueous solution of hydrofluoric acid as the etching medium. The work was done in fume cupboards in a quiet part of the factory, so that there was little likelihood that the worker would be distracted from the routine. Rubber gloves and apron were worn. The tubes to be etched were mounted on brackets in the fume cupboards. The acid was contained in a wax dish and was applied with a rubber applicator. Each cupboard was closed between applications by means of a foot pedal. Alongside the worker was a sink with running water in which the gloved hands were washed after each application.

In some way the right glove became perforated without the worker's knowledge, and a quantity of acid entered the glove. It is uncertain how long it was there before she noticed pain in the hand, but it was thought to be about four minutes. The glove was then immediately removed and the hand washed in a warm saturated solution of sodium bicarbonate. Magnesium oxide paste was massaged into the hand and fingers, and she was taken to a neighbouring hospital, together with a copy of Thelwall Jones's instructions, for injection of calcium gluconate solution. The burn was there seen to involve the whole hand. Thus the injection of calcium gluconate into and under the coagulum must have presented a formidable problem. After the injection, magnesium oxide cream was again applied. The pain was not relieved by the treatment. The following morning she was stated to be in great pain, morphine being required to give relief. The hand was grossly swollen, as were the fingers, and the burned skin was white and insensitive. The appearance suggested complete ischaemia of the digits, possibly due to vasospasm.

The patient was transferred to this unit, where she arrived about 20 hours after the accident. The hand presented a startling appearance. The pain was severe, and seemed to be situated deep in the palm. The fingers were insensitive to touch, were grossly swollen, and were a dirty grey. They appeared completely bloodless. The palm, which was insensitive to touch, presented a large grey blister, which was opened and found to contain sero-purulent fluid. This was collected and tested for fluoride,

with a negative result. The blister was snipped away. The fifth, fourth, and third fingers, the tip of the index finger, and the tip of the thumb were grey and necrotic. It was possible to snip into the pulp of the middle finger without pain. The tissue was coagulated and necrotic right down to bone. The lateral side of the index finger and most of the thumb had escaped the acid. The medial side of the index finger had suffered a partial-thickness burn of the skin. The back of the hand had a patchy, partial-and-full-thickness burn of the skin (Fig. 1). It was obvious at this stage that the three medial fingers were necrotic, the condition being probably due to deep penetration by the acid. The depth of penetration of the palm was uncertain, but there was at least full-thickness destruction of the skin (Fig. 2). Further calcium gluconate was injected and magnesium oxide cream was applied, more as a gesture of despair than in the hope of doing any good.

FIG. 1

FIG. 2

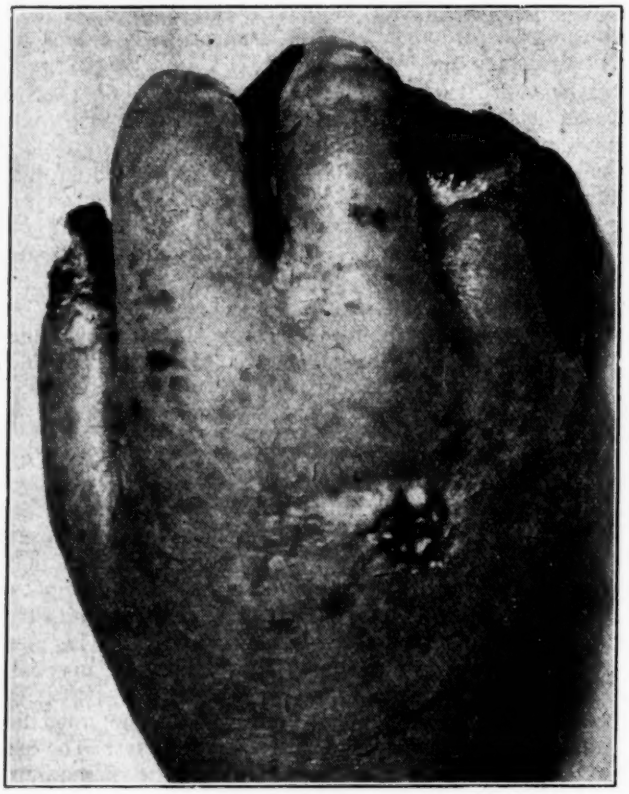

FIG. 3

FIG. 4

On the sixth day after the accident the whole of the slough on the palm of the hand was excised under general anaesthesia. It extended down to palmar fascia, but the latter was largely intact and healthy bleeding tissue was reached. An immediate split-skin graft was applied to the palm. The fingers were left at this stage, as there seemed to be less necrosis than was at first feared. It was believed that more digital tissue might be saved by waiting for clear demarcation.

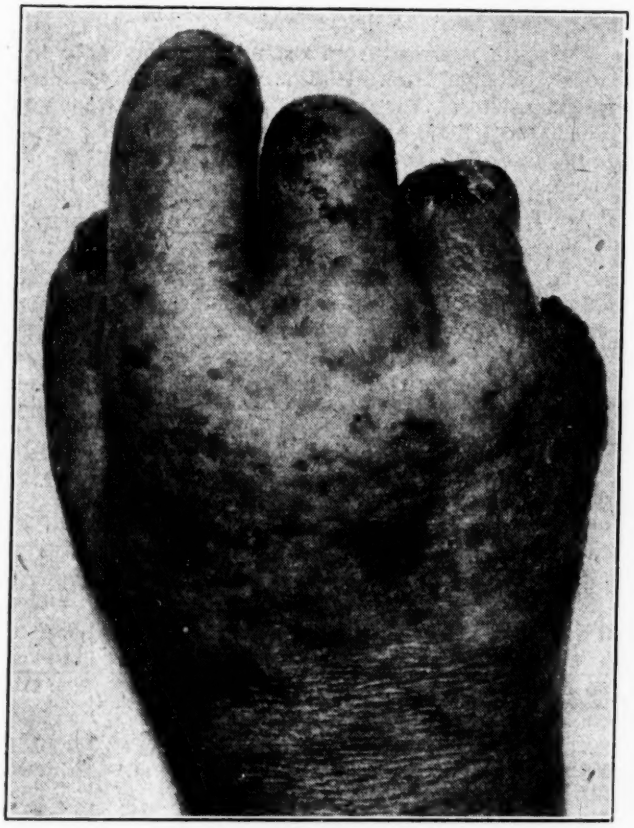

FIG. 5

FIG. 6

The palmar graft took surprisingly well, and exercises to thumb and index finger were begun on the tenth day after the accident.

On the 38th day the demarcation of the sloughing tissues was clear (Figs. 3 and 4). The necrotic portions were all removed and the stumps were closed with the aid of split-skin grafts. Healing was almost complete in 60 days from the accident (Figs. 5 and 6). The hand was tender at first, but function steadily returned to the useful claw formed by the index and thumb remnants. The wide mobile palm, ensured by the early excision and grafting, is proving a great asset.

Discussion

This case reveals the crippling lesions which may result from the action of hydrofluoric acid on the tissues of the hand. Until such a case has been seen it is difficult to realize that such extensive latent destruction is occurring under an apparently superficial lesion. The extreme penetrative power of hydrofluoric acid and the deep necrosis which it causes are not yet adequately explained. They are clearly not due merely to its acid properties, since solutions of other mineral acids much stronger in this respect do not produce comparable lesions. Lloyd Potter suggests that there may be some special action of the fluorine ion on living tissues. Compounds containing fluorine have long been known to act as protoplasmic poisons (Roholm, 1937; Greenwood, 1940); and it is quite certain that organic compounds containing this element, in particular the fluoracetates, have a specific and intensely poisonous action on certain vital enzyme-systems (Peters, 1950). It would appear, indeed, that a more direct and detailed biochemical study of the nature of the action of hydrofluoric acid on tissues and their constituents might yield information which would throw light on its extraordinary penetrative power *in vivo*.

The first-aid treatment of hydrofluoric acid burns is most important. The early and thorough injection of calcium gluconate into and under the coagulum is imperative. A general anaesthetic would have been necessary for adequate injection in the case I have reported. It would therefore seem justifiable to amend the instructions for treatment as follows: "Injection of 10% solution of calcium gluconate into and beneath the coagulum of the whole burned area, under local or general anaesthesia, as required."

It must be borne in mind that the injection of calcium gluconate solution, or indeed of any other fluid, into the tissues of the fingers can produce sufficient pressure to endanger the circulation and may lead to necrosis.

Once the active progress of the burn has been controlled there is much to be gained by early excision of the slough and application of free grafts. In the present case the area of the palm where the slough was excised and a skin graft applied was virtually healed within 14 days of the accident.

Summary

Attention is drawn to the fact that little is known generally of hydrofluoric acid burns and their treatment. The literature on the subject is confined to industrial medical journals.

The chemistry and toxicology of hydrofluoric acid are reviewed.

A severe case of hydrofluoric acid burns of the hand is reported and treatment is described.

Some modification of the treatment of hydrofluoric acid burns is suggested, and the early excision and grafting of the lesions are urged.

I should like to thank Sir Archibald McIndoe, Mr. Percy Jayes, Dr. A. Thelwall Jones, and Dr. A. Lloyd Potter for their criticism and help in the preparation of this paper; and Mr. Gordon Clemetson for the photographs.

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TWO TYPES OF DIABETES MELLITUS, WITH AND WITHOUT AVAILABLE PLASMA INSULIN

BY

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AND

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The sensitive technique of assay of small amounts of insulin described by Bornstein (1950) was used by Bornstein and Trewhella (in press) to investigate the plasma insulin content of 11 diabetics. It was found that three had available insulin and eight had none.

We have now investigated the available plasma insulin content of two different types of human diabetes which have been suggested on clinical grounds to be due to (1) lack of insulin and (2) factors other than lack of insulin (Lawrence, 1951).

The first type is generally young and is characterized not only by hyperglycaemia but by rapidly developing *ketosis* and severe weight loss, and requires insulin to live. The second type consists largely of middle-aged obese females with similar grades of hyperglycaemia and glycosuria, but with *no ketosis* and no important loss of weight. Their diabetes is easily controlled by low diets without insulin, particularly if weight is reduced.

Technique

Five patients of each type have been tested immediately after diagnosis and before any treatment. They drank 50 g. of glucose instead of breakfast, and two hours later venous blood was collected in a heparinized syringe and immediately centrifuged, and 1 ml. of plasma was injected into each of six alloxan-diabetic, hypophysectomized, and adrenalectomized rats. The fall in the true blood glucose of the rats one hour after plasma injection was determined.

The results are read from a standardization curve previously obtained from the same rats with re-crystallized Novo insulin. The method proved sensitive from 1/20,000 to 1/2,000 of a unit of insulin (0.05 to 0.5 milliunit), according to the formula $E=67.48+41.85\ X$, where X is the $\log_{10}$ of the dose in milli-units/100 g. rat. The results are expressed briefly in the Table.

Group 1: Severe, with Ketosis

Patient:	1	2	3	4	5
Sex and age ..	M 32	F 52	F 9	M 28	M 42
Weight (kg.) ..	46	56	25	41	54
Blood sugar mg./100 ml.	431	382	406	268	318
Glycosuria ..	++++	++++	++++	++++	++++
Ketonuria ..	++++	+	++++	+	++
Mean change in blood sugar..	+1	−3	−3	0	−2
Standard deviation ..	±6	±9	±7	±6	±7
Plasma insulin milli-units/ml.	0	0	0	0	0

0 = below lower limit of the assay.

Group 2: Obese, no Ketosis

Patient:	6	7	8	9	10
Sex and age ..	F 35	F 47	F 53	F 46	M 57
Weight (kg.) ..	79	69	75	85	83
Blood sugar mg./100 ml.	292	381	312	311	232
Glycosuria ..	++++	++++	++++	++++	++++
Ketonuria ..	0	0	0	0	0
Mean change in blood sugar..	−28	−30	−22	−25	−23
Standard deviation ..	±19	±9	±6	±8	±8
Plasma insulin milli-units/ml.	0·26	0·29	0·19	0·24	0·20

It seems clear from these results that available plasma insulin is absent and present respectively in these two different types of diabetes. The difference might be due to grades of severity of the same process, but this seems unlikely in view of the widely differing clinical picture. Further tests may show an intermediate content of plasma insulin, but it is to be noted that in the previous series reported no intermediate types were found. The technique opens wide possibilities for research into the nature and aetiology of "diabetes."

We are indebted to Dr. Hallas Mölder, of the Novo Terapeutish Laboratories of Denmark, for crystalline insulin free from the glycogenolytic factor and to Messrs. Boots Pure Drug Company, Ltd., for their research grant for expenses.

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Ethylene oxide is being increasingly used commercially as a fumigant, and a recent Home Office pamphlet (*Fumigation with Ethylene Oxide: Precautionary Measures*, H.M.S.O., February, 1951, price 6d.) outlines the risk of explosion and of poisoning by this not unpleasantly smelling gas. A method of detecting low concentrations of the gas is described, and the wearing of respirators by operators working in pairs is essential during the airing period. First aid consists principally in removal to the open air, artificial respiration, and administration of oxygen.

SEX PATTERN AND SIZE OF FAMILY

BY

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The Report by the Royal Commission on Population (1949) gives details of changes which have occurred in the size of families since the 1860's and discusses the factors which have led to them. It is well known that the size of the average family has recently fallen considerably. This tendency is common to most of the peoples of Western civilization and is almost entirely confined to them. It is a reflection of a slowly spreading change of habits and traditions which began in the nineteenth century, without, however, making any noticeable alteration in the birth rate until some fifty years later. Since that time there has been a continuous decline in family size.

There have been fluctuations in this downward trend for various reasons, but the acceptance of the idea of voluntary family limitation has remained, and has spread through nearly all classes and ages of people. This phenomenon can be regarded only as a fundamental and irreversible adjustment to modern conditions. As there is no evidence of a falling off in fertility, there can be no doubt of the fact of planned and deliberate family limitation.

It was thought reasonable to inquire if there might be another factor influencing the parents besides the actual number of children desired—namely, the sex of the children. Some parents might be expected to wish their families to include at least one boy or one girl, or they might want a mixed family. The ultimate size of some families could conceivably be influenced by these preferences, which might even in some cases overcome considerations of mere size.

The Investigation

In order to investigate this possibility, data were obtained from a class of second-year medical students in the University of Glasgow in 1947. About 230 students were given a questionary which asked for the age and sex of each child in their own families—that is, present generation—and in the families of their parents and grandparents—that is, parents' and grandparents' generation. They were also asked to state the age of both parents at marriage and their present age.

TABLE I.—*Mean Family Size in the Three Generations. The Differences Between the Means are Statistically Significant in All Cases*

Generation	Mean Family Size	Standard Deviation
Present	2·66	1·505
Parents'	5·488	2·88
Grandparents'	6·075	2·86

A few students refused to take part in this investigation, and some of the forms which were returned gave incomplete information or concerned a family in which a second marriage had occurred. These forms were discarded and the final number used for the analysis was 196. In every case the age of the mother was such that it could be assumed that the family was complete.

The mean values of family size were calculated (Table I). The mean size fell slightly from the grandparents' generation to the parents' generation, and quite considerably in the present generation. The differences between the means are significant in each case.

The mean interval between the birth of each child of the present generation was 44 months, and of the parents' generation 34 months. The average time which elapsed between the marriage of the parents and the birth of the first child of the present generation was 28 months, but no information on this point can be given for the previous generations.

The possibility that the composition of a family might be a factor in determining its ultimate size was investigated by means of the fourfold table. In Table II the present generation is considered with respect to the first two children born. From those families which were two or more in number two groups were made—one in which the first two children were both of the same sex, and a second in which the first two were of different sexes. These two groups were again sorted according to whether the family stopped at two or was subsequently increased. Out of a total of 70 families in which the first two children born were of different sex there were 30 cases in which subsequent children were born and 40 cases in which the family stopped here.

TABLE II.—*Fourfold Table to Indicate Whether the Sex of the First Two Children in a Family Affects the Ultimate Size of that Family. The Difference Between the Two Groups is Significant in Both Generations*

First Two Children	Present Generation		Parents' Generation	
	Stop	Go On	Stop	Go On
Sex same	33	52	10	164
Sex different	40	30	20	121
	$\chi^2 = 4{\cdot}46$ $P = 0{\cdot}04$		$\chi^2 = 5{\cdot}49$ $P = 0{\cdot}02$	

In those families in which the initial composition was either two boys or two girls there was a greater tendency for the family to increase; in 52 cases the family increased, and only in 33 cases did the family remain two in number. This suggests that where the family consisted of a boy and a girl more parents were satisfied—that is, they considered this a suitable family. In the instances in which the sex of the first two children was the same, the subsequent increase in family could be explained as a desire on the part of the parents to have a child of the opposite sex. In such a complex situation no more than a tendency in a particular direction could emerge, and a number of parents were apparently uninfluenced by such considerations. If we assume that all the families were deliberately limited (which is not necessarily the case) the number of children rather than the sex was the determining factor in the plans of this group.

The families in the parents' generation were sorted in the same way. Although many more families continued to increase in size than was the case in the present generation, analysis revealed a similar tendency, and the differences were again significant (Table II). The greater tendency in the parents' generation to have more than two children is a reflection of the reproductive pattern of the time, but even then the sex of

the children already born may have begun to have some influence on the family size. It is perhaps worth noting that in one family, made up of five girls, the last two born were named Robertina and Adamina, which suggests a little wishful thinking on the part of their parents.

The fourfold table was again used in both the present and the parents' generations to divide the families with respect to the first three children (Table III), but

TABLE III.—*Families of the Present and Parents' Generations Divided as Before With Respect to the First Three Children Born. There is no Significant Difference Between the Two Groups in Each Generation. It Appears that in a Family of This Size it is the Number of Children Rather than the Sex Pattern of the Family which is More Important*

First Three Children	Present Generation		Parents' Generation	
	Stop	Go On	Stop	Go On
Sex same	10	8	15	70
Sex different	36	30	35	159
	$\chi^2 = 0{\cdot}034$ P = 0·86		$\chi^2 = 0{\cdot}0062$ P=0·94	

no significant differences appeared. This could be interpreted as meaning that when a family has reached a total of three the decision whether or not the family should be increased is made independently of the sex of the children already born.

Discussion

The pitfalls involved in attempting to deduce human motives from such statistical data are well known, and it may be that an inquiry on a larger scale than the present one is necessary to yield reliable conclusions. It may even be that the motives for increasing the size of the family which we have selected are not the real ones, but the statistical examination of the data is not against those ideas. This small inquiry shows that there is a tendency for the size of a family to depend on the sex of the children already born. It is well known that in order to maintain the level of the population it is necessary for parents to have a family larger than two in number. According to these results, where a family consists of a boy and a girl, in the present social circumstances, there is less chance of another child being born than is the case when the family consists of two boys or two girls. Details of the size of families resulting from marriages which took place in 1925 are given in the Royal Commission on Population Report (Table 17, p. 26). These families form the present generation; 14% of these marriages resulted in a family of three children and 25% in a family of two children. The data obtained in the student survey suggests that in some cases at least of these 25% of parents the number of children stopped at two because the parents were satisfied with the sex pattern of their families.

The critical moment, from the point of view of the size of the future population, is at the birth of the second child. The sex of this child will, I think, decide for a certain number of parents whether their ideal family has been reached, or whether a state of disappointment exists which may induce them to have another child. If I may be permitted a long-distance glance into the future I might quite properly ask what the parents of the future would do if sex determination became possible. If the motives which appear to have been exposed by the analysis of our data continue to influence parents, the family size of the future may be somewhat smaller than it is at present, as many parents will choose to have a boy and a girl.

Although the time has not yet come for us to be concerned by this apparently remote contingency, it is suggested that the influence of the composition of the family in deciding family size, quite apart from any consideration of motivation, is worthy of consideration now. In the population surveys which have so far been made no attention has been given to the possibility of such an effect.

I wish to express my thanks to Professor G. H. Bell for his considerable help and advice.

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BLOOD FLOW IN GOUT

BY

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Professor Wood Jones (1950) has written an account of gout based on observation on a single patient—himself. Emboldened by this precedent of my former teacher, I record here some observations of the peripheral blood flow in a case of this disease. The opportunity of making this study was fortuitous, and was aided by the fortitude of the sufferer, who would have been expected to shun an instrument such as a plethysmograph as he would the torture rack.

Case History

The patient, a sergeant aged 55, was first seen by me on June 8, 1950, at another hospital, where he was admitted for investigation of pain in his right leg induced by exercise. He stated that he first noticed a slight ache in his right calf after taking part in the Victory March in 1945. The symptom recurred after long walks and became more pronounced in the following year, at which time he could walk two miles (3.2 km.) before experiencing discomfort. During the 12 months before his admission to hospital his walking distance before feeling pain had decreased gradually to 100 yards (91 metres). On stopping, the pain disappeared in three to four minutes, after which he could again walk a similar distance. After much walking the calf muscles became tender to pressure.

On examination he was seen to be a well-nourished middle-aged man. His blood pressure was 150/95 mm. Hg. Apart from the changes noted in the arterial system, routine clinical examination revealed no abnormality. The brachial and radial arteries were not clinically thickened, and they pulsated normally. Normal pulsation was felt also in both femoral and left popliteal arteries. No pulsation was noted in the right popliteal or the dorsalis pedis and posterior tibial arteries of either foot. Oscillometry showed good pulsation in his left calf but no pulsation in his right calf.

Electrocardiographic tracings were normal; *x*-ray examinations showed the heart outline to be within normal limits and provided no evidence of vascular calcification in either leg.

Arrangements were made for the patient to be sent to the Alfred Hospital for plethysmographic study. Whilst awaiting this move he suddenly developed severe pain, redness, and slight swelling in the region of the metatarsophalangeal and first interphalangeal joints of his left great toe. A week later a similar condition occurred in his right

great toe. This pain was relieved by colchicum. When the patient arrived for the tests, both feet presented the picture of acute podagra, the medial aspects of the first metatarso-phalangeal regions being red, swollen, hot, and excruciatingly tender. However, by virtue of the stoicism of an old soldier, the investigation was carried out.

One month later, *x*-ray examination of the region of the great toe revealed an irregular rarefaction of the head of the first left metatarsal, and the blood uric acid was 4.7 mg. per 100 ml.

Two months later the acute gout in his left foot had completely subsided, but there was still some tenderness to pressure over the first metatarso-phalangeal region. A plethysmographic study was repeated at this time.

Plethysmographic Findings

The peripheral blood flow was measured by my modification of the technique of venous occlusion plethysmography (Barnett, 1950). Briefly, the foot, at heart level, is sealed by means of a combination of rubber sheeting and surgical jelly in a gas-tight box, the air in which is maintained at the desired temperature by means of an outer water-jacket. Venous occlusion is produced by a pneumatic cuff applied to the limb just proximal to the plethysmograph and inflated for periods of a few seconds at a pressure of 70 mm. Hg. Changes in volume of the enclosed portion of the limb result in proportionate changes in pressure in the plethysmograph box, and these are recorded by means of a Wigger type of manometer and optical system.

The room temperature was kept between 22 and 24° C., and the temperature of the air in the plethysmograph between 34 and 35° C. Before recordings were made the patient rested for 45 minutes on the bed in the room in which the investigation was carried out.

In addition to determining resting blood flow, arterial occlusion reactive hyperaemia tests were done in order to determine the increase of blood flow in response to the accumulation of metabolites. In these tests a cuff applied above the knee was inflated to a pressure above the systolic arterial blood pressure for 10 minutes, and the blood flow was recorded each quarter-minute following deflation until reactive hyperaemia had occurred.

The plethysmographic findings are recorded in the Table. Illustrative tracings are shown in Figs. 1 and 2.

Blood Flows, Recorded as ml./100 ml. Limb Volume/Minute

	Left Foot		Right Foot	
	Gout	No Gout	Gout	Gout Subsiding
Resting	5	1	1·7	2·2
After reactive hyperaemia test ..	7·2 (1¼ minutes after release)	5·3 (1¼ minutes after release)	*	2 (2¼ minutes after release)

* The reactive hyperaemia blood flow in the right foot during the attack of gout could not be recorded owing to the patient's restlessness.

Comment and Discussion

The resting blood flow of 5 ml./100 ml. of limb volume/minute from the left foot on the first examination was extremely high (the value in a normal foot being usually 0.5 to 2 ml./100 ml. of limb volume/minute), and the increase to 7.2 ml./100 ml. of limb volume/minute with the reactive hyperaemia test was less than would normally occur, suggesting that the vessels of the foot were already under the influence of a powerful vasodilator. This was confirmed by the finding, on the second examination (after the subsidence of the attack of acute gout), that the resting blood flow was only 1 ml./100 ml. of limb volume/minute, and the reactive hyperaemia test produced an increase to 5.3 ml./100 ml. of limb volume/minute.

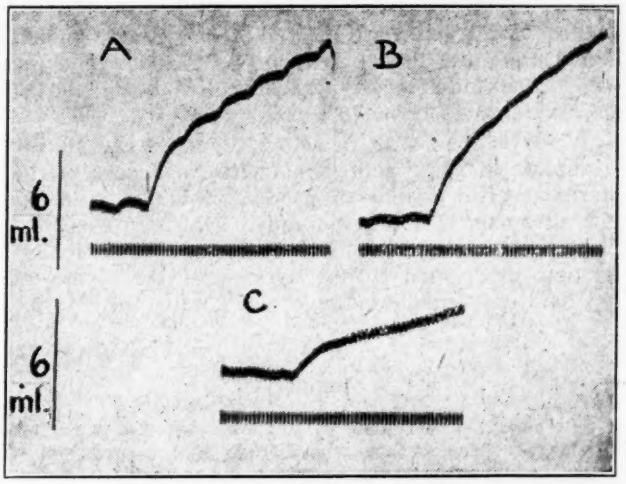

FIG. 1.—Plethysmograms on June 27. Blood-flow curves from: A, left foot, resting; B, left foot, following reactive hyperaemia test; C, right foot, resting. Vertical line marked 6 ml. represents standardization; time markings in tenths of second. Note the presence of pulse waves on the plethysmogram from the left foot and their absence in that from the right foot.

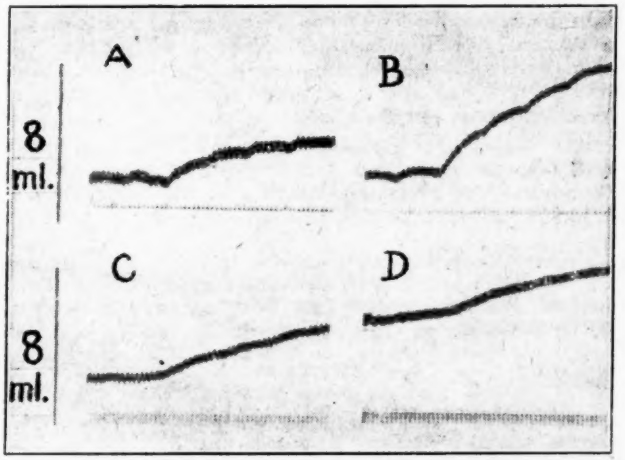

FIG. 2.—Plethysmograms on August 22. Blood-flow curves from left foot: A, resting; B, following reactive hyperaemia test. Blood-flow curves from right foot: C, resting; D, following reactive hyperaemia test. Vertical line marked 8 ml. represents standardization. Time markings in tenths of second.

The somewhat late appearance of the maximum reactive hyperaemia (which normally occurs in less than one minute) and its somewhat low value suggest that there was some obliterative arterial disease in the left leg.

The resting blood flow in the right foot on both examinations was approximately 2 ml./100 ml./minute (this being in the higher range of values obtained in normal individuals), and no increase was obtained by the arterial occlusion reactive hyperaemia test, indicating that the blood flow to the foot was already maximal.

The demonstration of the increased blood flow in feet affected by acute gout is in accordance with Professor Wood Jones's contention that gout is a syndrome associated with some disturbance of the vasomotor nerves, being a condition kindred to erythromelalgia. Whether this is indeed the mechanism or whether the agent concerned acts directly on the vessels cannot be decided from the present observations. In either case the pain and the tenderness would be expected to be maximal in the region of the medial

aspect of the first metatarsophalangeal joint in the area of the large collection of superficial veins, so well demonstrated by Professor Wood Jones. However, the usual localization of the syndrome to one foot during an attack would favour a nervous basis.

Whatever the site of its action, the agent causing the syndrome of acute gout would seem to be one of the most powerful peripheral vasodilators known, and has the advantage that it acts locally. However, even if it were isolated, after reading Professor Wood Jones's graphic description of the agonies of the victim of podagra one would hesitate to give it a therapeutic trial.

Summary

The history of an attack of gout in a man, the subject of obliterative peripheral arterial disease, is presented.

Measurement of the blood flow during the attack of acute gout showed that the resting flow in the foot of the limb less affected by peripheral vascular disease was very high, and little increased by reactive hyperaemia. When the acute attack had subsided the resting blood flow in this foot returned to normal, and there was a marked increase in the blood flow following reactive hyperaemia.

In the foot of the limb more affected by peripheral occlusive arterial disease, the resting blood flow was in the range of high normal values both during the attack of acute gout and when it had almost subsided, and the flow was not increased by the reactive hyperaemia test.

It is argued that the demonstration of the high blood flow in acute gout lends strong support to the thesis of Professor Wood Jones that the basis of this condition is a vasomotor disturbance akin to erythromelalgia.

Grateful acknowledgment is made to the technical assistants of the Alfred Hospital Clinical Research Unit and of the Baker Medical Research Institute for help in carrying out the plethysmography.

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The flagella of bacteria have recently received fresh experimental attention, in the hope of deciding what they are and how they function. It seems fairly certain that they are in fact swimming organs by which motile bacteria propel themselves, and not the mere lifeless mucous twirls which Pijper believed them to be on the basis of dark-ground illumination of hanging drops under the microscope. Dr. Claes Weibull, of the University of Upsala, one of the workers in this field, reviews present knowledge in *Nature*, (March 31, p. 511). He himself has been able to separate the flagella from the bacterial bodies, and to make chemical studies on pure solutions from which, by the addition of ammonium sulphate, the flagella can be precipitated in aggregates with spirals very like those seen during life. The flagella are found to be protein, belonging to the myosin-fibrinogen group on *x*-ray analysis, and containing very little cystine but about 8% of lysine, which again is somewhat like the myosin of mammalian muscle. Electron micrographs have revealed that each flagellum is composed of a bundle of adhering long fibrils, and Dr. Weibull describes how if these fibrils alternately contracted and relaxed swimming movements would result. Where the energy for this movement comes from, however, is obscure. Practically no carbohydrate or organic phosphorus has been found in purified flagella, and the very narrowness of a flagellum, taken with its great projection from the bacterial body, makes it difficult to imagine the processes of vertebrate muscle metabolism taking place inside.

POLIOMYELITIS AND DIPHTHERIA IMMUNIZATION IN BELFAST

BY

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We were made aware of the findings of Martin (1950), Geffen (1950), and McCloskey (1950) on the possible association between inoculations and site of paralysis in January, 1950. A retrospective investigation of our previous poliomyelitis epidemic in 1947 failed to reveal any such association. However, this epidemic occurred during the holiday months, when little immunization is done. A careful inquiry was arranged for any future epidemic.

Our first case of poliomyelitis in 1950 was notified on February 13. There were no further cases until March 12. In the next four weeks nine cases were reported, all from within an area of one square mile (2.6 sq. km.) in the city. Except for a boy aged 15 all patients were under 3 years old. Six of these children had paralysis of an arm, alone or in combination with other sites, but no history of inoculations. This fact encouraged us to allow our immunization scheme to continue.

From the middle of April cases began to be notified from all parts of the city. The incidence remained high in young children, but the proportion showing involvement of the arms became smaller. The epidemic wave gradually climbed to a peak in July and then more rapidly descended in August and September. Immunization against diphtheria continued as usual until the holiday closure of the clinics on July 8.

Up to September 19 a total of 98 cases of poliomyelitis confirmed by hospital diagnosis occurred in Belfast; 10 of these were non-paralytic. There were eight deaths —a case fatality rate of 8.2%.

Table I shows the age distribution of the cases: the population shown at each age is calculated from the registered live births and infant deaths. The Registrar-General's office sugests this as the best method available here, and believes that it is reasonably accurate in the lower ages.

TABLE I.—*Age Incidence of Poliomyelitis in Belfast*

Age:	0–	1–	2–	3–	4–	5–	6–	7–	8–	9 and Over
Population	8,773	9,303	9,973	9,797	9,025	9,529	9,524	8,775	7,658	—
Cases of poliomyelitis	10	27	13	7	6	7	3	5	2	18
Incidence per 1,000	1·1	2·9	1·3	0·72	0·66	0·73	0·32	0·57	0·26	—

All cases were admitted to the Northern Ireland Fever Hospital, and the clinical details were obtainable from Dr. F. F. Kane, medical superintendent, and Dr. Forsythe and Dr. McConnell, medical registrars. The immunization history was obtained from the parents. Accurate dates were supplied by the general practitioner or clinic concerned, except in a few cases in which immunization had occurred some years earlier.

From the information thus obtained Table II was prepared. This is similar to Tables II and III of Hill and Knowelden (1950), but includes all children under 9 years of age. The wider age range was adopted because more children were receiving inoculations in the age

range 5 to 8 years than in the under fives owing to the large number of booster doses given in the older group in addition to the primary immunizations in that group.

TABLE II.—*Sites of Paralysis and Previous Inoculation History in Children Under 9 Years of Age*

Site of Paralysis	Interval Between Last Injection and Onset of Poliomyelitis			No Previous Inoculations	Total
	Less than 1 Month	Between 1 and 3 Months	3 or More Months		
Right arm ..	—	—	8	15	23
Left arm ..	—	—	6	16	22
Right leg ..	1	1	19	16	37
Left leg ..	—	1	16	18	35
Trunk ..	—	—	10	17	27
Cranial nerves	1	2	4	10	17
Total No. of: (*a*) Sites ..	2	4	63	92	161
(*b*) Children	2	3	28	40	73
Non-paralytic cases ..	—	—	5	2	7

Table II shows that two children developed poliomyelitis within one month after inoculation. One was an infant of 1 year old who had received bismuth injections in the hips in December, 1949, and January and February, 1950, with a considerable local reaction after the first of these. On May 26 0.5 ml. of A.P.T. was injected into the right hip, and paralysis of the right leg developed on June 4—an interval of eight days. The other patient was a child of 17 months who last received inoculation of 0.5 ml. of P.T.A.P. in the left arm and developed a facial paralysis 23 days later.

Three children developed poliomyelitis within one to three months after inoculation. These had been injected in the arm, but paralysis did not develop in the injected limbs, two having facial paralysis and the other having paralysis of both legs.

The 28 children who developed paralysis more than three months after inoculation were, with one exception, injected in the arms. In this group paralysis affected the arms less than the legs.

Forty non-inoculated children contracted paralytic poliomyelitis. This group showed involvement of the arms to be almost equal to that of the legs. This unusual proportion was due to the experience of non-inoculated children under 2 years as shown in Table III.

TABLE III.—*Comparison of Sites of Paralysis in Non-inoculated and Inoculated Children Under 9 Years of Age*

Site of Paralysis	Inoculated Children				Non-inoculated Children			
	0–1 Year		2–8 Years		0–1 Year		2–8 Years	
	No.	%	No.	%	No.	%	No.	%
Right arm ..	3	13	5	11	10	19	5	13
Left arm	2	9	4	9	11	21	5	13
Right leg ..	7	30	14	30	7	13	9	23
Left leg	5	22	12	26	10	19	8	20
Trunk	3	13	7	15	8	15	9	23
Cranial nerves ..	3	13	4	9	7	13	3	8
Total sites ..	23	100	46	100	53	100	39	100
Total children ..	12		21		25		15	

Hill and Knowelden, in their series collected from 33 widespread areas, showed that for children under 2 years of age in whom paralysis occurred the legs were involved approximately two and a half times as often as the arms (57% to 23%) among those not previously inoculated. In our series of non-inoculated children the proportions in the same age group were 32% legs to 40% arms. In our series the absence of excessive arm involvement is observed in the inoculated group under 2 years of age (52% legs to 22% arms). As most of the paralysed series in Belfast's inoculated cases were inoculated more than three months before the onset of poliomyelitis, our inoculated group is roughly in accord with what would be expected from Hill and Knowelden's series (57% legs to 23% arms in the series inoculated three or more months before onset). The very different proportions observed in the non-inoculated group are apparent under 2 years of age, but in the age group 2–8 years the proportions approximate more closely to the usual ratio, though even in this group the proportion of arm involvement would appear to be high (43% legs to 26% arms).

The relationship between site of paralysis and site of previous inoculation with the time intervening is given in Table IV, using the statistical arrangement of Tables IV and V of Hill and Knowelden.

TABLE IV.—*Site of Paralysis in Relation to Site of Last Inoculation in Children Under 9 Years of Age*

Site of Paralysis in Relation to Site of Inoculation	Interval from Last Inoculation to Onset of Poliomyelitis in Months					
	0–	1–	2–	3–	6+	Total
Same site ..	1	0	0	0	0	1
Included site ..	0	0	0	2	5	7
Different site ..	1	3	0	3	13	20
No paralysis ..	0	0	0	0	5	5
Total No. of children ..	2	3	0	5	23	33
% of total falling in same and included categories	50	0	0	40	22	18

The fact that only two cases occurred within one month of inoculation precludes the expression of a definite opinion on the extent to which an association between site of paralysis and site of inoculation is coincidental.

It is felt that an assessment of the risk of association between site of paralysis and site of inoculation would be helpful. In Belfast, notifications of 1,074 children immunized during the poliomyelitis epidemic were received from general practitioners. Only four children were inoculated with the combined diphtheria–pertussis antigen, 1,006 children received A.P.T. (two inoculations each), and in 64 children the antigen was not stated. The records of diphtheria prophylactic issued by the local health authority show that all practitioners except two were supplied with A.P.T. However, it is almost certain that all immunizations performed during the epidemic were not notified. Hence it is possible to make only the rough estimate that the one case of association between site of paralysis and site of inoculation with A.P.T. described above occurred out of more than 2,000 inoculations of A.P.T. given by general practitioners.

An accurate record of children inoculated with P.T.A.P. at the immunization clinics was available.

Experience with P.T.A.P.

In Belfast 55% of pre-school children and 90% of school-children are immunized by public health doctors. Prior to 1948 the antigen used was A.P.T. With this preparation about 2% of school-children had a considerable local reaction. After this date P.T.A.P. was used for all ages, with a noticeable reduction in the number of reactions.

During the period January 1 to July 8, 1950, 2,227 children received two doses of 0.5 ml. of P.T.A.P. and 1,796 children received one dose. The latter were mainly "booster" doses. These 4,023 children were injected intramuscularly in the left arm. The age grouping is shown in Table V.

TABLE V.—*Ages of Children Inoculated with P.T.A.P. From January 1 to July 8, 1950*

Age:	1–	2–	3–	4–	5–	6–	7–	8–	9 and Over
No. of children	477	263	128	114	358	1,426	824	433	—

In this group of P.T.A.P.-inoculated children we had six cases of poliomyelitis. One of these occurred within a month after inoculation. This is the case, already mentioned, in which facial paralysis occurred 23 days after inoculation. In the remaining cases the periods between inoculation and onset of illness were 32 days, 45 days, 55 days, 4 months, and 5 months. The three children with the shorter periods showed involvement of the face or legs but not of the arms. The other two had extensive paralysis of limbs, with the arms least involved.

Discussion

The Belfast epidemic does not offer enough material for discussion of the possibility that an inoculation produces the onset of poliomyelitis. Comment is confined to the extent of the association between site of paralysis and site of inoculation.

It would seem reasonable to define association between inoculation and poliomyelitis as involvement of the inoculated limb, alone or in combination with other sites, within one month after the inoculation. The time limit is arbitrary, but an extension to three months would not include any further cases in Belfast. This definition serves the purpose of this report, which is that of comparison.

McCloskey reported 340 cases of poliomyelitis investigated, and found this association in 24. The antigens concerned were combined diphtheria–pertussis (14 cases), pertussis alone (6 cases), and A.P.T (4 cases). Geffen's report includes 182 cases of poliomyelitis in children under 5 years, and shows the association with inoculations in 30 cases; the antigens being combined antigen (21 cases), pertussis alone (1 case), and A.P.T. (8 cases). The impression given by these figures is that the combined antigen is most often responsible. This may very easily be not so, as no accurate estimate of the extent of the use of these various antigens in the areas concerned is given. Geffen makes a rough estimate that the risk is about 1 in 1,800 or 1 in 1,900 inoculations. He bases these figures on the assumption that 80% of the children reaching 1 year of age during the epidemic received three injections each. These figures, he states, are almost certainly too high—that is, the risk is greater than his estimate.

From the accurate records of P.T.A.P. inoculations given during the Belfast epidemic, which affected the age groups being inoculated, it can be stated that no case of association as defined above occurred after 6,250 inoculations. The administrative action taken in Northern Ireland, late in July, to discourage immunization during the epidemic prevents any better estimate being made here.

This limited experience cannot, of course, prove that the association does not occur with P.T.A.P. In fact, Dr. Guy Bousfield informs me that he has had one probable case following the intramuscular use of an experimental batch of P.T.A.P. However, our experience is that P.T.A.P. is a relatively innocuous antigen so far as induction of poliomyelitis in the inoculated limb is concerned. Bousfield (1950) has suggested that the use of such an antigen as P.T.A.P. subcutaneously is the answer to the current diphtheria immunization problem. This is supported by the experience recorded in Belfast.

Summary

An epidemic of poliomyelitis is reported in which non-inoculated children under 2 years of age show an unusual involvement of the arms.

An association between site of inoculation and site of paralysis was not found after 6,250 inoculations of P.T.A.P. in children of the age group affected by the poliomyelitis epidemic.

I am indebted to Dr. E. A. Cheeseman, of the Department of Preventive and Social Medicine, Queen's University, for guidance in the statistical aspects and for much constructive criticism; to Professor A. Bradford Hill and Dr. Guy Bousfield for many useful comments; to Dr. S. Barron, M.O.H., Belfast, for permission to publish, and for the encouragement given by him and Dr. W. G. Swann, deputy M.O.H., Belfast, to continue immunization during the epidemic of poliomyelitis.

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ANTI-TRACHOMA CAMPAIGN IN GOZO

BY

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In June, 1948, I was entrusted by the Government with the task of carrying out an intensive anti-trachoma campaign on the island of Gozo (near Malta), which has a population of about 28,000 spread out in the only city and in twelve villages.

Trachoma had long been reputed to be more prevalent in Gozo than in Malta, and it was the scope of this investigation to examine the whole population, to find out how many were affected, and to treat, by the most efficient methods, those found suffering from the disease.

It was decided to tackle school-children first, next their contacts, and finally the population at large. I undertook to examine all children attending the Government primary schools and their contacts, while the district medical officers were to carry out a house-to-house inspection of the whole population. Any cases about which the district medical officers were not too sure were referred to me for an opinion.

Diagnosis

Examination of patients was carried out in a good light with the aid of a loupe; the finding of trachoma follicles was essential for making a diagnosis. The search for inclusion bodies and examination with a slit-lamp were carried out only in some of the more difficult and doubtful cases. Differential diagnosis in this series

was chiefly between trachoma on one side and follicular conjunctivitis and the folliculosis sometimes met with in children on the other. Trachoma follicles were found, as expected, mostly on the tarsal conjunctiva of the upper lid. They were more numerous at the upper border of the tarsus, especially at its inner and outer extremities: they were irregular in size, shape, and distribution, and their number varied widely. Only a few were found in early cases, and they tended to be small; the conjunctiva in trachoma tended to be red, hyperaemic, and uneven, especially in active cases of long standing. Mucoid and mucopurulent discharge was found in some cases, while pannus was a variable finding.

Diagnosis was sometimes difficult, and in order not to swell the number of cases unduly, and yet obtain as accurate a record as possible, such cases were labelled non-committally "conjunctivitis." About half of such cases later proved to be trachoma, while the other half cleared up completely in a very short time. To Professor Sorsby we owe the observation that under treatment with sulphonamides the follicles of trachoma tended to follow a certain pattern of evolution: they first became larger and more opalescent, they next coalesced with neighbouring ones, and finally they became flatter before disappearing. My cases showed this behaviour, which enabled me to make a diagnosis in dubious cases, as follicles other than trachomatous did not evolve according to this pattern.

Treatment

Of recent years we have made real progress in the treatment of trachoma. The old drastic methods of cauterization and expression have largely been abandoned, and the place of physical methods of treatment, such as *x* rays and diathermo-coagulation of follicles, is rapidly being established. There is as yet no standard therapy of trachoma accepted by all, but most ophthalmologists seem to prefer the use of the sulphonamides, penicillin, "aureomycin," and other antibiotics. In a campaign such as the one under review the choice of treatment has to be determined chiefly by financial considerations as well as by the means available to enforce such treatment.

I decided to use the sulphonamides both locally and perorally. The drug employed was sodium sulphacetamide. The plan was to give patients tablets in full doses for ten days (as recommended by Professor Sorsby), and to instil drops of the 30% solution at least three times a day, while the 6% ointment was to be applied at night. I was afraid that not all would co-operate in accepting treatment, and so various talks to different sections of the community were arranged in order to explain the reasons for the drive and what was expected of people.

With the permission of the authorities concerned, I asked school teachers to give tablets to affected children during school hours and to instil drops in their eyes. The teachers rose to the occasion by accepting this public duty in spite of the many inconveniences it entailed. Tablets were given at 8 a.m., noon, and 4 p.m., while drops were instilled at the same times. The ten-day period during which children had tablets was divided into two five-day periods with an interval of two days between them (Saturday and Sunday). Such a system had obvious defects: holidays and absenteeism hampered regularity of treatment, while there was a long gap between the last treatment of the evening and the first one the following morning. I tried to avoid some of these defects by giving drops and ointment to the children's parents, who were asked to supplement the treatment at school. One could never be certain how much was being done at home, but at least one was sure that a measure of treatment was being carried out in the school. Resistant cases received a second and a few a third course of tablets.

All contacts of affected school-children as well as the majority of the rest of the population have been examined and those found affected were given medicines free of charge and told how to use them. Periodically they were all seen by me to check and control progress.

Results

Details of the results obtained are shown in Tables I and II.

TABLE I

School	No. of Pupils	Trachoma	Conj.	2 Courses Tablets	3 Courses Tablets	No. of Cases Left after 2 Years	
						Trachoma	Conj.
Victoria:							
Boys ..	324	42	26	13	Nil	Nil	Nil
Girls ..	387	32	21	11	,,	,,	,,
Ghainsielem:							
Boys ..	136	22	Nil	7	,,	1	,,
Girls ..	179	21	11	6	,,	Nil	,,
Zebbug:							
Mixed ..	183	18	19	6	,,	,,	,,
Sannat:							
Mixed ..	269	113	14	9	,,	2	,,
Nadur:							
Boys ..	260	26	20	11	,,	Nil	,,
Girls ..	374	47	36	8	2	,,	,,
Xaghra:							
Boys ..	255	38	11	6	Nil	1	,,
Girls ..	339	50	42	5	2	Nil	,,
Gharb:							
Mixed ..	222	15	19	4	Nil	,,	,,
S. Laurenz:							
Mixed ..	71	6	7	1	,,	,,	,,
Kercem:							
Mixed ..	193	21	12	8	,,	,,	,,
Ghasri:							
Mixed ..	65	3	9	Nil	,,	,,	,,
Xewkja:							
Boys ..	223	74	Nil	6	,,	,,	,,
Girls ..	378	141	6	20	,,	2	,,
Qala:							
Boys ..	84	25	Nil	16	1	Nil	,,
Girls ..	116	27	17	4	Nil	,,	,,
Total ..	4,058	721	270	141	5	6	,,

TABLE II

School	Trachoma Cases		Average Age	No. of Contacts of School-children
	No.	%		
Victoria	74	10·4	8·07 years	103
Ghainsielem ..	43	13·6	8·64 ,,	42
Zebbug	18	9·8	7·5 ,,	21
Sannat	113	42·0	8·95 ,,	161
Nadur	73	11·5	8·34 ,,	144
Xaghra	88	14·8	8·81 ,,	102
Gharb	15	6·8	11·05 ,,	7
S. Laurenz ..	6	8·4	10·66 ,,	1
Kercem	21	10·9	9·47 ,,	8
Ghasri	3	4·6	8·33 ,,	3
Xewkja	215	35·8	9·48 ,,	272
Qala	52	26·0	9·35 ,,	62

In all, 4,058 school-children were seen, and of these 721 were found suffering from trachoma, and 270 from "conjunctivitis." Examination of members of families of affected children revealed that 926 contacts were actually suffering from trachoma. In a house-to-house examination of all persons on the island, 12,698 have so far been seen, and of these 612 had trachoma. The above figures show that the incidence of the disease is much greater among school-children than among the rest of the population. The percentage of affected

school-children varied widely. It was lowest at Ghasri (4.6% of all school-children), while it was the highest at Sannat (42%). Complete figures for the rest of the population are not yet available.

Early cases and those in which treatment was applied more scrupulously recovered more quickly, but some were very resistant. Any discharge present at the start of treatment usually disappeared within a few days, and for this reason no particular measures were taken to segregate school-children. District nurses carried out frequent visits to households of infected persons to give fresh medicine, to show how drops were best instilled, to advise on the important hygienic aspects of the disease, and to encourage perseverance in treatment.

Cases were declared cured and treatment was stopped when all follicles disappeared and when the conjunctiva became smooth and shining. The duration of the disease varied according to the stage at which treatment was started and to the regularity and assiduity of treatment. An idea of the length of treatment may be had from the following figures. After 13 months of the above course, only 117 cases of trachoma and seven cases of conjunctivitis were still under treatment in the primary schools of Gozo. After a further period of nine months, only six cases of trachoma were left in those schools. Of the 926 contacts, only 354 were left after six months' treatment.

Comment

It is probable that trachoma is spread by contact, through fomites, or through vectors. Lice and flies have long been suspected of being at least partly responsible for the spread of the infection, but no definite proof of this has been forthcoming in this investigation. Lice would abound in less hygienic dwellings, and this fact might at first thought be linked with the generally accepted view that trachoma is a disease of the lower classes. My experience, however, has not borne this out. I found trachoma among all classes with practically equal frequency, but patients of the upper classes tended to have fewer complications, and trachoma was often discovered on routine examination for other conditions. The better hygiene of the upper classes probably prevents or hinders the occurrence of secondary infections, which are responsible for some of the symptoms and some of the complications of trachoma. The case for the fly as trachoma carrier does not seem to be placed on better foundations: this insect is practically ubiquitous in Gozo, and it was found in great numbers in some of the areas where trachoma was less prevalent.

I have already mentioned that the incidence varied greatly from one part of the island to the other. I found this rather baffling, as it is difficult to believe that the state of hygiene would materially differ from place to place. It will be seen from the tables that Sannat and Xewkja, in the south and central parts of the island, had the greatest incidence, while S. Laurenz, Gharb, and Ghasri, in the western sector of the island, showed the lowest number of cases. Again, at the eastern tip, Qala showed a much greater incidence among school-children than did the neighbouring village of Nadur.

The average of affected children was of some interest; the age of those attending the primary schools was between 6 and 14; that of trachomatous children between 8 and 11. This finding agrees with that of an investigation carried out in Malta several years ago, and its constancy may mean that children of the ages stated have greater contact between themselves, and that spread occurs chiefly in the schools. If this were confirmed, control of school-children would eliminate this disease in a short time.

The part played by immunity in trachoma is obscure but is well worth further study. In this investigation it was quite common to find only a few persons affected in a household, while three cases had trachoma in one eye only. Again, the fact that some cases responded to treatment better than others raises the question of different strains of the trachoma virus.

The sulphonamides have no doubt proved to be a milestone in our age-long fight to conquer trachoma, but they are not the ideal answer to the ophthalmologists' dream. Our goal should be to find a method capable of controlling the disease in a matter of days. Despite several claims, we are probably still far from this, although newer drugs, such as aureomycin, are proving very satisfactory.

Summary

The working of an intensive anti-trachoma drive on the island of Gozo is described. All primary-school children, their contacts, and a large section of the general population have so far been examined, and those found affected given free treatment. This consisted of sulphonamides by mouth for one or more periods of 10 days each, the instillation of sodium sulphacetamide drops (30%), and the application of sodium sulphacetamide ointment (6%). The campaign has yielded very good results, especially in respect of school-children. In two years only 6 out of 721 cases remained under treatment. Sulphonamides have proved very valuable in our fight against trachoma, but we are still in search of a method capable of controlling the disease in a matter of days.

My grateful thanks are due to Professor A. C. Briffa, Chief Government Medical Officer, Malta, for permission to publish this paper, and for constant encouragement and advice in the conduct of this campaign.

Medical Memoranda

Acute Tuberculous Peritonitis Treated with Streptomycin

Up till recently streptomycin has rarely been used in cases of tuberculous peritonitis in this country, mainly owing to difficulties in obtaining the drug. So far there has been no British literature on the subject; but cases have been reported in the U.S.A., from the Medical Department, Veterans Administration Hospital. A number of cases were treated for from 25 to 164 days, and the results were most successful; the temperature came down to normal, and the patients gained weight and felt very well.

Reports on streptomycin treatment have been received from Egypt, the results also being very satisfactory. These papers say that improvement was pronounced in the first two weeks. Similar good results have been obtained in the Argentine, France, and Russia.

We should like to add two cases of acute tuberculous peritonitis treated with streptomycin and *para*-aminosalicylic acid ("P.A.S.").

Case 1

A single female clerk aged 23 years was admitted on November 30, 1949, with a seven-days history of pain in her abdomen, unrelieved by any form of therapy and associated with vomiting. At the age of 18 she had dry pleurisy; there was no family history of tuberculosis.

On examination the patient was seen to be well nourished; palpable glands were present in the neck, she had a cough, and her temperature was 101.6° F. (38.7° C.). The lungs showed some degree of dullness on the right side, with diminished air entry and vocal resonance. The abdomen was slightly distended, and there was diffuse tenderness with signs of free fluid in the abdominal cavity. A radiograph of the chest disclosed an effusion in the right pleural cavity. Her sputum did not contain tubercle bacilli. The erythrocyte sedimentation rate after one hour was 65 mm. A blood count showed: Hb, 80%; red cells, 4,900,000 per c.mm.; white cells, 7,000 per c.mm. A film revealed occasional hypochromic cells. Tuberculous peritonitis was diagnosed, and laparotomy performed.

On exploring the abdomen the peritoneum was nearly ¼ in. (0.6 cm.) thick, and this confirmed the diagnosis of tuberculous peritonitis. The abdominal cavity contained a large quantity of straw-coloured fluid, several pints being aspirated from the pelvis. The intestines were matted together into one homogeneous mass and many tubercles were seen on the peritoneum and the bowel wall. The pelvic organs showed typical tuberculous infection, both tubes being densely adherent to the brim of the pelvis.

It was suggested that the patient might be treated with streptomycin. The fluid was sent to the laboratory for culture, which later showed a growth of tubercle bacilli.

Treatment consisted of 1 g. of streptomycin daily, given in four equal doses. After 12 days, P.A.S., 12 g. daily, was added to prevent streptomycin resistance. A few days later the temperature began to subside, and on examination the lung fields were clear. The patient was transferred to Leasowe Open-air Hospital, where treatment was continued; a complete course of 88 g. of streptomycin was given.

After six months the E.S.R. was only 3 mm. in one hour; her weight had increased by 8 lb. (3.6 kg.), and her general condition improved considerably. She continued to attend the out-patient department at regular intervals for further supervision.

Case 2

A housewife aged 46 was admitted on January 11, 1950, with a history of pain in her abdomen radiating towards the back; the pain was not related to food. There was no nausea or vomiting, and her temperature was 104° F. (40° C.).

On examination the patient was very flushed; auscultation of the lungs revealed scattered crepitations and rhonchi; there was dullness at the right base with diminished air entry. A radiograph of the chest revealed a right-sided pleural effusion. A blood count at this time showed: Hb, 70%; red cells, 4,800,000; white cells, 7,600 (polymorphs 80%, lymphocytes 17%, hyalines 3%). A film showed marked anisocytosis with many hypochromic cells. The E.S.R. was 76 mm. in one hour. The abdomen showed some degree of distension combined with diffuse tenderness. A mass could be felt in the lower part of the abdomen on the right side, and evidence of free fluid was present. It was decided to perform a laparotomy to confirm the diagnosis, which clinically was suggestive of tuberculosis.

The abdomen was opened through a subumbilical midline incision and a large quantity of fluid escaped. The appearances were typical of acute tuberculous peritonitis, the peritoneum, bowel, and pelvic organs all being studded with minute tubercles. About a gallon (4.5 litres) of fluid was present in the pelvis; the omentum was rolled up and thickened, particularly in the neighbourhood of the right iliac fossa, and this thickening was the cause of the mass described above. The abdomen was closed in the usual way. The fluid, unlike that in Case 1, was sterile on culture.

Streptomycin treatment, 1 g. daily given in four equal doses, combined with 12 g. of P.A.S., was begun immediately. The patient's general condition improved rapidly, her temperature subsided, and the physical signs in the lungs and pleura became normal after 14 days. At this stage she was transferred to Leasowe Open-air Hospital. The E.S.R. dropped to 15 mm. in one hour, the patient put on weight, and her general condition improved considerably. She was kept under further observation and attended the out-patient department. The total dosage of streptomycin given in this case was about 80 g.

It is interesting to note the similarity between these cases. Both patients had considerable pyrexia on admission, and an effusion was present in the pleural cavity. It is, of course, impossible to reach a conclusion at the present stage, and further prolonged observation is necessary before the results of this treatment can be assessed.

We are indebted to Dr. J. K. Cameron, medical superintendent, Leasowe Open-air Hospital, for his assistance in treating these cases, and to Dr. L. Ashcroft, pathologist, St. Catherine's Hospital, for the bacteriological findings.

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Conception in Spite of Extreme Oligozoospermia

Three case histories are presented to illustrate the point that a finding of extreme oligozoospermia does not necessarily mean a hopeless prognosis. After treatment natural conception occurred in each instance. Although with the degree of oligozoospermia present this is very rare, it does suggest that, at least with young couples, a grave but guarded prognosis is more appropriate, and that treatment should be attempted.

For purposes of comparison we may mention that at this clinic the minimum standard of fecundity of semen (not ordinarily necessitating treatment) requires a volume of not less than 2 ml., a density of not less than 30,000,000 spermatozoa per ml., 50% motility after two hours at 37° C., with not more than 25% abnormal headforms, a low content of testicular cells and polymorphs, and absence of agglutination of sperms.

Case 1

This couple were referred on account of infertility. The husband was 26 and an only child; wife 25; married six years; intercourse never satisfactory. The husband worked long hours as a chef in hot and airless surroundings. He had no history of illness, except dental caries. He looked pallid and ill, and had extensive acne of the face, neck, and back. The right testicle was undescended; the left testicle had descended and was of normal size.

First Semen Test.—After one week's abstinence. Volume, 5 ml.; occasional spermatozoa, immotile after two hours, and with variable but generally bad differentiation; many polymorphs.

He was advised to take a different job with shorter hours and to limit his smoking to 10 cigarettes a day. He was given a course of sulphonamides, followed by injections of iron and arsenic for six weeks, and also B vitamins and a liver preparation by mouth.

Second Semen Test.—Two months later: after one week's abstinence. Large volume (6 ml.); many granular bodies; occasional non-motile spermatozoa in fresh specimen; occasional spermatocytes; no polymorphs.

After continuation of the previous treatment the acne disappeared, he looked much better, put on weight, and lost his fatigue.

Third Semen Test.—Two months later: after one week's abstinence. Very large volume (8 ml.); occasional motile sperms in fresh specimen, which were still motile after five hours at room temperature; no cells.

He was then treated for four weeks with serum gonadotrophin 500 units three times a week. His wife was examined at this stage and found to have a severely ulcerated cervix covered with purulent Nabothian follicles from which a viridans-type streptococcus was isolated. The cervix was cauterized, sulphonamides were given by mouth, and penicillin intracervically and systemically. She responded well to treatment, and no other abnormalities or infertility factors were found.

A post-coital test after treatment of the wife showed sperms in the vagina, but none in the cervical canal.

Fourth Semen Test.—Five months after the third: after 12 days' abstinence. Volume, 3.4 ml.; 0.025 million sperms per ml.; sperms immotile after two and three-quarter hours.

The couple were advised to continue the general dietary measures and to practise planned intercourse; the latter was now much more satisfactory. Pregnancy occurred 18 months after the start of treatment of the husband and proceeded normally until the 12th week, when spontaneous abortion took place. Couple advised to try again; a second conception occurred 15 weeks after the miscarriage, but again miscarriage took place—at six weeks (time of writing).

Case 2

Advice was sought on account of infertility. The husband was 29; wife 22; married two years; intercourse satisfactory. Seven years prior to marriage the husband was treated by *x* rays for two months on account of ankylosing spondylitis; he was left with one hip fixed. He also had a history of chronic sinusitis, dysentery, and dengue fever, with severe debility while a prisoner of war in Java. He was now working in an office and appeared pale and underweight; he had severe nasal catarrh, and inquiries showed that his diet was deficient in protein.

First Semen Test.—After six days' abstinence. Volume, 4 ml.; occasional well-differentiated sperms, which were motile after three hours; no cells.

Testicular Biopsy.—(One month later.) This showed islands of tubules with evidence of spermatogenesis surrounded by shrunken tubules containing only an undifferentiated syncytium.

The husband was told how to supplement his diet, and was given a liver preparation and vitamins A and D by mouth, and also a full course of iron and arsenic. Conception occurred three months after the beginning of his treatment. Healthy boy, 7 lb. 8 oz. (3.4 kg.), born. Progressing well.

Case 3

This couple was referred on account of infertility. The husband was 31; wife 33; married three and a half years; intercourse satisfactory, but infrequent. It was the wife's second marriage, and she had one child by her first husband. Her present husband had been operated upon in youth for undescended testicles, with reasonably good results, and, though the scrotum and penis were small, the testicles were of normal size. He was working as an electrical engineer, and complained of decreasing libido; otherwise he was well, and he had no history of relevant illness. Two semen tests had been carried out before reference to us, and the sperm counts were stated to have been one million per ml. on the first occasion and seven millions per ml. three years later.

First Semen Test.—After four days' abstinence. Volume, 4.7 ml.; 0.88 million sperms per ml.; approximately 62% abnormal forms; 36% active after one and three-quarter hours at 37° C.; 32% active after three and three-quarter hours at 37° C. (high viability); a few leucocytes present.

The husband was given a 200-mg. testosterone implant (Mr. G. Quist), with the result that his libido improved.

Second Semen Test.—Three months later: after 24 hours' abstinence. Volume, 2.1 ml.; 0.725 million sperms per ml.; 80% abnormal forms; 17% active after three and three-quarter hours at 37° C.

Third Semen Test.—One month later: after four days' abstinence. Volume, 4.2 ml.; 0.78 million sperms per ml.; 60% abnormal forms; 7.5% active after two hours; 5% active after four hours at 37° C.

During this period the wife had routine fertility tests, and nothing was found wrong with her. Pregnancy occurred three months after the start of the husband's treatment, and the pregnancy is proceeding satisfactorily at the time of writing, now being just over the four months without, so far, any threat of miscarriage.

Although we have had cases under our care in which the sperm counts of the husband showed remarkable variations in a short space of time, in these three cases it is unlikely that the counts varied much during the period of observation. Conception in each case took place naturally in spite of the exceptionally low counts recorded. It will be noted, however, that the semen volume was in each case rather above average, and this may have had some compensatory effect. Again, although some degree of spontaneous recovery might have been expected in Case 2, there seems little doubt that treatment in all three cases accelerated the achievement of pregnancy. It will be recognized that restoration, where necessary, of the wife's fecundity is essential (cf. Case 1). Also, our knowledge of the patients concerned and their circumstances virtually excludes the factor of deception.

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The Ministry of Health is now setting up fourteen committees to look after the training of nurses, one for each of the fourteen regional hospital areas of England and Wales. They are to be somewhat inelegantly known as Area Nurse-Training Committees, and each will have 15 members (16 or 17 in the metropolitan regions) representing various interests. Five will represent the General Nursing Council, one the Central Midwives Board, four the regional hospital board, and one (two or three in metropolitan areas) the teaching hospitals. In addition the Minister will appoint two people after consultation with the local health authorities, and two after consultation with the local education authorities and with such universities as he thinks fit. A certain specified proportion of all these people must be State-registered nurses. The work of the committees is to advise and assist all training institutions, and also, if asked to do so, the General Nursing Council, and to promote improvement and research into training methods. All this is giving effect to recommendations made in 1947 by the working party on nursing.

Reviews

HEART AND CIRCULATION

Diseases of the Heart and Circulation. By Paul Wood, O.B.E., M.D., F.R.C.P. "The Practitioner Series." (Pp. 589; illustrated. £3 10s.) London: Eyre and Spottiswoode. 1950.

In the development of scientific knowledge there comes a time when it is necessary to pause and take stock. If advances are rapid the need for such appraisal and correlation recurs frequently. This book, whose publication is timely, admirably fulfils this need, for in cardiology new methods of diagnosis and treatment have followed each other in breathless succession during the past fifteen years. In his preface, however, Dr. Wood warns us that "we are in danger of losing our clinical heritage and of pinning too much faith in figures thrown up by machines." Throughout the work a proper balance is preserved between clinical and instrumental methods, and between theoretical and empirical considerations.

Such swift evolution, in which older theories must often be discarded and debatable ideas advanced, leaves many vexed questions in its train. On problems of this kind books such as this should take a decided line, and it is one of the many merits of this one that the author has no difficulty in doing so. For example, he is ready not only to treat cardiac infarction with anticoagulants but to use them for prevention of this disease. This is refreshing after the short and uncompromising condemnation these drugs received by Laubry and Soulié in *Les Maladies des Coronaires* (Paris, 1950) and the hesitant attitude adopted by many authorities in Britain. On the other hand, treatment with khellin in angina "awaits confirmation," the value of vitamin E "has not been confirmed," and attempts to improve the coronary circulation from without "scarcely justify the risk entailed." These views are in line with current opinion in this country; but one might have expected a more encouraging attitude towards block or resection of the stellate ganglion for intractable angina. The principal new methods of investigation—namely, cardiac catheterization and angiocardiography—have unravelled problems in heart failure and congenital heart disease respectively, and on these two important themes Dr. Wood is particularly illuminating.

There is little to criticize in the detail of the text. Probably most physicians have felt with the passage of time that they have inclined to pessimism in prognosis. In the present work many may think that too gloomy a view is taken of the outlook in left ventricular failure consequent on hypertension and aortic valve disease, and that the quoted significance attached to T-wave inversion in left-chest leads in hypertension is too unfavourable. A minor point in treatment of heart failure is the mention of an unusually large intravenous dose (1 mg.) of ouabaine. To the statement that the only contraindication to mersalyl therapy is acute nephritis might be added the risk of acute retention in patients with prostatic enlargement, for this difficulty is not infrequent.

Dr. Wood is so successful in his text and in his schematic drawings that one is disappointed by the poor reproduction of many of the radiographs; these are in contrast with the excellence of many of the cardiograms. Most of the clinical photographs are admirable. Each chapter is followed by many references, which are cited with discrimination and drawn not only from British and American but also from Continental sources. The value of such a selective bibliography, which is nevertheless free from national bias, is obvious, and students of cardiology will find in it not only the milestones of cardiological advance but the papers that make up the body of modern knowledge of heart disease. It should be added that Dr. Wood has interested himself in and worked on many of the themes that he discusses in this work, and it is this thread of personal contribution that knits the book into a very readable and important exposition of diseases of the heart and circulation.

K. SHIRLEY SMITH.

THIOSEMICARBAZONES IN TUBERCULOSIS

Chemotherapie der Tuberkulose mit den Thiosemikarbazonen. By Gerhard Domagk, with the collaboration of C. Arold, K. Boshamer, H. Delfs, L. Heilmeyer, R. Kalkoff, Ph. Klee, R. Knorr, F. Kuhlmann, A. Lemberger, H. Malluche, and K. Ullmann. (Pp. 405; 257 illustrations. M. 60.) Stuttgart: Georg Thieme. 1950.

Domagk is best known as the discoverer of "prontosil" and thus as the main originator of sulphonamide therapy, but he is responsible for two other major therapeutic innovations, for he introduced quaternary ammonium compounds as antiseptics and thiosemicarbazones for the treatment of tuberculosis. These drugs, of which the most widely used is 4-acetylaminobenzaldehyde thiosemicarbazone, or thiacetazone (Tb 1 698 or "conteben" in Germany, "tibione" in the U.S.A.), were arrived at by way of a study of the tuberculostatic action of the sulphonamides, sulphones, and related compounds. They have been extensively used in Germany in treating the vastly increased amount of tuberculosis which has resulted from overcrowding in bombed cities, malnutrition, and the return of large numbers of infected war prisoners. Their degree of chemotherapeutic activity is certainly much inferior to that of streptomycin, but of the same order as that of *p*-aminosalicylic acid. On the other hand they are considerably more toxic than the latter, the maximum tolerated dose of Tb 1 698 being usually only 0.3 g. daily.

The already considerable literature on this subject is unified in this book. The first chapters are by Domagk himself. Two, on the tubercle bacillus and the morbid anatomy of tuberculosis, are useful but not essential to the subject; the third, on the chemotherapy of tuberculosis generally, presents the experimental groundwork of thiosemicarbazone therapy. The remainder are on clinical use, several chapters being devoted to lung disease and others to tuberculosis of the skin, lymph nodes, intestine, urogenital system, and bones and joints. None of these clinical studies was controlled in the same sense as the early trials of streptomycin in this country, and the extent of the benefit conferred can therefore not be certainly assessed. A final chapter is on the action of Tb 1 698 on the plasma proteins. An alteration in their relative proportions produced by giving the drug causes a striking and rapid fall in the sedimentation rate, and this has led to a trial in the treatment of chronic arthritis, with apparently favourable results. The book is profusely illustrated, largely by colour photographs of patients, microscopical preparations, cultures, and infected organs, as well as by skiagrams.

L. P. GARROD.

CHILDREN'S EYES

Diseases of Children's Eyes. By James Hamilton Doggart, M.A., M.D.(Cantab), F.R.C.S. Second edition, revised. (Pp. 304; 211 figures, including 33 coloured plates. £2 2s.) London: Henry Kimpton. 1950.

As the only one of its kind in the English language this book serves a useful purpose; the call for a second edition so soon after the first is evidence of its appreciation both in this country and abroad. Its value is undoubted, for the ophthalmologist practising among children finds that many of his standard diagnostic methods are inapplicable. The history, so important in the assessment of visual disturbance, is second-hand; subjective tests, which form the basis of ophthalmological diagnosis, are inapplicable; and the more elaborate objective methods of examination, such as with the slit-lamp, are inapplicable. The host of congenital deformities and degenerations, many of them familial, that may occur in the eye demand special knowledge; while the dependence of the visual future of the child on the early recognition and adequate treatment of such conditions as squint places ophthalmic therapeusis among children in a category of its own. To a considerable extent it is more important that this specialized knowledge be brought to the disposal of the general practitioner and the paediatrician than to the ophthalmologist, who should already be acquainted with it, and the clarity of the exposition, the readability, and the interest of Doggart's book, as well as its avoidance of unnecessary detail and the discussion of rarer abnormalities, make it a useful guide for a wide public.

Fortunately the second edition is no longer than its predecessor, but it has been brought up to date by the inclusion of new clinical entities which have recently excited interest, such as retrolental fibroplasia. The illustrations, already good and profuse, have been improved, and the useful bibliographies have been expanded. Moreover, the technique of the production is up to the high standard we have come to expect from its publisher.

STEWART DUKE-ELDER.

MEDICINE AND WELFARE

The Future in Medicine. The March of Medicine, 1949. Number XIV of the New York Academy of Medicine Lectures to the Laity. (Pp. 160. 16s.) New York: Columbia University Press. London: Geoffrey Cumberlege. 1950.

The New York Academy of Medicine Lectures to the Laity were instituted 14 years ago. This volume includes lectures on law and medicine, the endocrines, science under dictatorship, blood and man, and the criminal within us. All will be read with interest by any medical man. The lecture on "The Endocrines, Servants or Masters," is of great interest in showing the evolutionary development of the endocrine glands and the reciprocal relationship between the endocrines and the nervous system. The endocrine glands are to a large extent controlling mechanisms which have been inserted as the organism has increased in complexity. "Science Under Dictatorship," by Leo Alexander, tells the harrowing story of the road which led Nazi medicine to genocide, human experiment, and intensive research in "ktenology," or the science of killing. It was a long road, which began before the Nazi regime in the demand for euthanasia, and Leo Alexander draws two important conclusions. The first is that we launch ourselves down the descent to Avernus once we break the Hippocratic oath, "to abstain from whatever is deleterious and mischievous, and to give no deadly medicine to anyone if asked, nor suggest any such counsel." The second is that "the killing centre is the *reductio ad absurdum* of all health planning based only on rational principles and economy, and not on humane compassion and divine law." In the modern State there is a temptation to think that what is useful is good, and to act only for the welfare of the majority. True democracy implies the realization that all men are brothers and must be treated so, however unproductive or tiresome they may be.

L. J. WITTS

BOOKS RECEIVED

Review is not precluded by notice here of books recently received

The Eye Manifestations of Internal Diseases. By I. S. Tassman, M.D. 3rd ed. (Pp. 672. 84s.) London: Henry Kimpton. 1950.

The Contribution of Surgery to Preventive Medicine. By Sir James Learmonth, K.C.V.O., C.B.E., Ch.M., F.R.C.S.Ed. (Pp. 55. 12s. 6d.) London. Geoffrey Cumberlege. 1951.

Lumbar Puncture and Spinal Analgesia. By R. R. Macintosh M.A., D.M., F.R.C.S.Ed., D.A. (Pp. 149. 21s.) Edinburgh: E. and S. Livingstone. 1951.

The Transmission of Nerve Impulses at Neuroeffector Junctions and Peripheral Synapses. By A. Rosenblueth. (Pp. 325. 48s.) London: Chapman and Hall. 1950.

Handbook of Antibiotics. By A. L. Baron. (Pp. 303. 52s.) London: Chapman and Hall. 1950.

Prince of Darkness. By various authors. (Pp. 250. 7s. 6d.) London: Rider. 1951.

Pavlov: A Biography. By B. P. Babkin. (Pp. 365. 25s.) London: Victor Gollancz. 1951.

Physiotherapy in Obstetrics and Gynaecology. By H. Heardman, M.C.S.P. (Pp. 228. 16s.) Edinburgh: E. and S. Livingstone. 1951.

A Textbook of Gynaecology. By J. Young, D.S.O., M.D., F.R.C.S.Ed., F.R.C.O.G. 8th revised ed. (Pp. 493. 40s.) London: Adam and Charles Black. 1950.

A Textbook of Medical Conditions for Physiotherapists. By J. E. Cash, B.A., M.C.S.P. (Pp. 350. 20s.) London: Faber and Faber. 1951.

Psychiatric Aspects of Juvenile Delinquency. By L. Bovet, M.D. (Pp. 90. 5s.) Geneva: World Health Organization. 1951.

A Study of Epilepsy in its Clinical, Social, and Genetic Aspects. By C. H. Alström. (Pp. 284. No price.) Stockholm: Einar Munksgaard. 1950.

Specific Dyslexia. By B. Hallgren. (Pp. 287. No price.) Stockholm: Ejnar Munksgaard. 1950.

Late Prognosis in Meningococcal Meningitis. By E. Trolle. (Pp. 310. No price.) Copenhagen: Danish Science Press. 1951.

Die Pathogenese des rheumatischen Syndroms. By B. Zorn. (Pp. 194. M. 9.) Jena: Gustav Fischer. 1951.

Geschichte der Medizin im Überblick mit Abbildungen. By T. Meyer-Steineg and K. Sudhoff. 4th ed. (Pp. 460. M. 18.) Jena: Gustav Fischer. 1950.

De Ductus Arteriosus. By Dr. E. Odé. (Pp. 154. Dutch fl. 8.) Leyden: A. W. Sijthoff's Uitgeversmaatschappij N.V. 1951.

Veränderung der Reaktionslage im Krankheitsverlauf. By Professor W. Koch. (Pp. 163. M. 14.) Berlin: Walter de Gruyter. 1951.

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THE CENSUS

The honourable Member for the City of York caught the Speaker's eye. "I did not believe," he said, with a malevolent glance at the Treasury bench, "that there was any set of men or, indeed, any individual of the human species, so presumptuous and so abandoned as to make the proposal we have just heard. . . . I hold this project to be totally subversive of the last remains of English liberty . . . and, indeed, the addition of a very few words will make it the most effectual engine of rapacity and oppression that was ever used against an injured people." The Bill that had so greatly roused the Member's wrath was put forward on March 30, 1753. It was a proposal to number the population of this country. Perhaps there was some justification for his opposition—more logical, certainly, than the fears of other Members of Parliament that an "epidemical distemper" would follow the impious action of numbering. Enumerations in other countries, it was true, had been used, and largely used, for purposes of taxation. However, the Bill had the support of the Government of the day and, in a somewhat amended form, it was passed. But the House of Lords would have none of it, and so another half-century had to pass before, in 1801, the first census of this country was in fact achieved.

To-day, on the eve of the fifteenth enumeration, we can approach the night of April 8 with a more reasonable degree of equanimity. We know—at least those of us who are old enough to remember 1931—that the personal details of our families that we have then legally to reveal will be treated merely as impersonal units in a table of figures, that the Registrar-General has no interest whatever in us individually but must have our help in building up his statistical and anonymous pictures.

The importance of these pictures to the administrator in local as well as central government, to the business man and the economist, to the social historian and the social reformer, and, indeed, indirectly to every one of us as a citizen, is discussed in articles in this issue by Mr. A. J. Taylor (p. 715) and Dr. W. P. D. Logan (p. 720). In matters of medical concern, Taylor, in tracing the history of our census with its ten-yearly sequence, reminds us how essential in the nineteenth century were the census returns in the development of our vital-statistical system, in the analysis of the annual returns of births, marriages, and deaths. It was William Farr's bringing together of these two sets of national data and his skilful but simple arithmetic thereon that gave substance to the arguments of those who pleaded for sanitary reform and for preventive medicine. Thus vital statistics, as is well known, played a great part in leading to such advances.

Yet, in spite of all Farr's work, it is still sometimes overlooked that the records of death and disease are insufficient alone to adorn a tale. The "exposed-to-risk" is equally fundamental, and, as Logan stresses, we need that exposed-to-risk in very great detail if full use is to be made of our records of mortality and morbidity. We need rates at different ages, rates in different localities, rates in different years and at different seasons of the year, rates in different occupations and professions, rates in different social classes, and so on. But for every such rate we need an accurate denominator (the numbers at risk) as well as a numerator (the recorded deaths or illnesses). It is the former that the census must supply, and this fine differentiation is, in fact, one of the main reasons for taking the census. For the country as a whole the Registrar-General has no difficulty in annually estimating the total population within a very narrow margin of error; he can, too, make very good estimates of its age distribution. But with local populations and their age components he is on more doubtful ground, while the numbers at ages who are employed in different ways are almost impossible to come by. Most such estimates too, it must be remembered, are based upon the most recent census, so that at not too long intervals a new foundation becomes essential.

The devil's advocate might perhaps ask, "Are all your ratios really necessary?" The answers are not far to seek and could be based upon endless examples. To take but one or two, we may very well need sickness rates to assess not only the state of the public health but how large a list a general practitioner can handle satisfactorily—and how far, also, a progressively ageing population may affect that number; we need to know the incidence of disease to plan the hospital services required in a locality; we need to look for industrial hazards through the death and sickness rates experienced by different occupations. And we have innumerable epidemiological problems to solve—is poliomyelitis really showing increasing attack rates on the adult population, is the tubercu-

losis death rate now falling or not, and to what extent, if any, are its geographical variations related to overcrowding? In all such cases the essential need is to know accurately the population at risk; without that we can make no advance and no discoveries.

Absolute accuracy is, of course, an impossibility in any inquiry by questionary—and the census is merely one such inquiry on a gigantic scale. Our predecessors soon became aware of that, and indeed John Rickman, the Clerk to the Speaker, who digested the returns at the first three censuses, reached in 1831 the conclusion that, except for the bare enumeration of a person with, one may concede, distinction by sex, no other question entirely free from objection had been propounded. As he wisely observed when difficult questions were put forward, there is no real advantage in "arriving at misinformation instead of resting in acknowledged ignorance." Sixty years later, at the census of 1891, there appeared no reason to alter that verdict. "Those who are conversant with forms and schedules," said the Registrar-General, "scarcely realize the difficulty which persons, not so conversant, find in filling them up correctly. . . . Even educated men often make extraordinary mistakes in this apparently simple operation." Another 60 years have passed and none of us, alas, can now be described as "not so conversant" with forms and schedules. It remains to be seen, therefore, whether we can make a better showing than our fathers and our grandfathers—whether we can remember to include those children under 2 years of age who up to 1931 mysteriously went unrecorded; whether we can recall our ages sufficiently well to avoid rounding them off to the nought (50, 60, 70, etc.) and overcome our father's and mother's superstitious dislike of an age ending in a seven; whether we can truthfully tell the Registrar-General, "I remember, I remember, the house where I was born"; and when, a little later, we ceased "full-time education in an educational establishment"; whether we can convey to him our precise occupation, however odd it may be; whether we can without nice questions of definition tell him how many living-rooms we possess and (a new question) whether we enjoy exclusive or only partial rights over a kitchen sink, a cooking-stove, a watercloset, and a fixed bath. It is this filling in of the form that perhaps will arouse our fears on April 8, 1951, not a fear of what may be done with the answers which so troubled the House of Commons 200 years ago. But if we do our best, as we must, legally and as good citizens, the Registrar-General promises us, in time, all the answers for a mere 6d. a head. It is a good bargain.

HEALTH SERVICE ESTIMATES

In a few days' time the Chancellor of the Exchequer will be presenting his Budget, and the people of this country will learn exactly what sacrifices in their standard of living will be asked of them in order to pay for the rearmament programme. It is perhaps not widely enough realized that, whatever the extent of the increases in taxation, sacrifices in the standard of living will be enforced in any case by the rapid rise in prices. Now that wage restraint has gone it is to be expected that there will be round after round of demands for higher wages—and salaries—to offset the rise in the cost of living. The most that can be hoped for is that incomes will not be pushed high enough to cover the whole rise in living costs and thereby prolong the inflation process longer than necessary. Like some diseases, inflation is self-limiting in duration, provided that no attempt is made to interfere with its natural course by misguided remedies such as further subsidies and controls. Nevertheless, it is bound to cause a great deal of misery before it finally abates, and the right course for the Government to take is to relieve real hardship—through such measures as higher national assistance scales and family allowances. For the rest it should see that its policy is directed towards building up the country's natural resistance to inflation; this means reducing the total demand on the country's resources, which means, among other things, reducing its own demands—that is, its own civil expenditure.

On page 754 a correspondent analyses the new estimates for the Health Service in the light of the "cold war" situation. As the biggest single item of the Government's civil expenditure, the National Health Service is an obvious target for economy. It is perhaps worth pointing out that, even without the problems created by rearmament, a radical change in the method of financing the Health Service would have been necessary. Of all the social services it is the one where flexibility is essential to success. Being based on the forward march of science, which introduces new treatments here and outmodes others there, the Health Service cannot function properly if it is kept in a financial strait-jacket without room for manœuvre. There was already, therefore, before the new situation created by defence measures, a strong case for giving more independence to those responsible for administering the Service, particularly the hospital authorities. There was also a case for introducing a charge for using the Service's facilities which

1 *British Medical Journal Supplement*, 1951, 1, 48.
2 *British Medical Journal*, 1950, 2, 162.
3 Ibid., 1951, 1, 462.
4 *The Scotsman*, March 29.

would enable it to expand where necessary without any further burden being placed on the taxpayer and which would also reduce unnecessary demands on it.

To-day, as our correspondent points out, the higher demands made by defence on the country's real resources have to be offset by a reduction in the other demands on them. So far as the Health Service is concerned this means two things. The demands it makes—i.e., in materials and man-power—can be reduced by a reduction in its total cost. It should be stressed that, even if the present financial limit is allowed to remain, in a time of rising prices this would imply a smaller demand on real resources. But in a service where so large a proportion of the total cost consists of fees, salaries, and wages, it is virtually impossible that the financial limit can be maintained. It is also arguable that the real resources set free by a reduction in the cost of the Health Service are not, except perhaps as regards man-power, such as can readily be used for defence purposes. This leads us to the other factor involved. If a charge were made to the public for using the Service the public—or that section of it using the Service—would have less money to spend on other things, and the economy in resources would be accordingly achieved.

There can be no escaping the fact that a much more effective economy of resources could be obtained by the introduction of a charge. From the recent analysis of hospital costs in Scotland it would appear that some £30m. could have been saved in 1950–1 in the whole of Great Britain if patients had been asked to pay the whole cost of their food while in hospital, and for their clothes and laundry. In the present year, with higher prices, the saving would be greater still. That there is a case for the levying of a hotel charge on patients admitted to hospitals was suggested by the B.M.A. in the evidence it recently presented to the Select Committee on Estimates.[1] The question of making token charges throughout the Service has been previously discussed in these columns.[2,3] In a country enjoying full employment and the many financial benefits of the welfare State the imposition of token charges could not be held to be a financial obstacle between a patient and the essential medical advice and treatment that he needs. Such token charges would not only relieve the State of part of the economic burden of the welfare services but it would—and more important than this—induce a real sense of responsibility towards the Health Service on the part of those who use it. On a common-sense view it is absurd that everyone should now be able to get, at the expense of the State, the usual household remedies which he or she previously bought direct from the chemist. There is much to be said for the Australian practice of making the essential and expensive drugs free of charge to the sick person and making the public pay for such things as aspirin and the common laxatives. Then, again, if a token charge of as little as 1s. were to be made for each *x*-ray film taken in N.H.S. hospitals a considerable sum of money would be available for reducing the cost of the hospital services. Some £15m. to £18m. is being spent on dentures; about £19m. is being spent on drugs and containers; and about £13m. is being spent on spectacles and opticians' dispensing fees. The medical profession would certainly not suggest that the whole of the cost of any one of these items should fall upon the consumer. Nevertheless, it is widely admitted that much of this money is needlessly spent because of the natural tendency to take full advantage of the opportunity of getting something (apparently) for nothing. But if token payments were to be made for, say, spectacles and dentures, again some relief of central funds would be effected, and the patient needing these appliances would feel some responsibility for making at least some direct payment for them. This view was supported by Sir William Marshall, chairman of the Executive Council for Lanarkshire, at a meeting in Glasgow last week.[4] The Government, he said, had greatly underestimated the public demand for the Service, and he advocated making a small charge for dentures, spectacles, and drugs.

At present the whole community of taxpayers has to foot the bill for extravagant and unnecessary demands made by part of the community. Not only is this bad economics but it induces a sense of irresponsibility on the part of those who quite gaily feel that so long as the Government sanctions it they can freely spend other people's money. It should be administratively fairly simple to meet the needs of such special categories as old-age pensioners. The cost of the Health Service rises each year, and will continue to rise. It is difficult to say how expenditure can be kept under some kind of control except by the introduction of token payments throughout the whole of the N.H.S., and if the reasons for this were carefully explained to the public any Government seeking to impose such charges would surely be able to rely upon an intelligent response from a people which has never asked to be mollycoddled.

TREATMENT OF METASTATIC THYROID CARCINOMA WITH RADIOACTIVE IODINE

It has been recognized for nearly a hundred years that thyroid carcinoma could occasionally function like the normal gland, but it is less than sixty years ago that von Eiselsberg[1] showed that hormone balance could be maintained by an actively growing metastasis of thyroid carcinoma following a total thyroidectomy. With the introduction of radioactive isotopes and the search for those which would be taken up selectively by malignant tumours, there was naturally an immediate interest in radioactive iodine and thyroid cancer. Hamilton, Soley, and Eichorn[2] in 1940 studied the deposition of radio-iodine in human tissues and noted the possibility that it might be stored in thyroid cancers in sufficient quantity for treatment. In 1942 Keston and his co-workers[3] were the first to demonstrate selective uptake of radio-iodine in a metastatic thyroid carcinoma both by Geiger counter and autoradiograph. Since then much work on this subject has been done, but it is not surprising, in view of the histological appearances of most thyroid carcinomas, that the proportion of tumours which have been found to concentrate iodine sufficiently for effective treatment has been disappointingly small. A number of attempts have been made to increase the concentration of the drug in tumours, chiefly by the preliminary removal of all normal functioning thyroid tissue, either surgically or by radio-iodine treatment, so that the metastases might then increase in functioning capacity and so demand more iodine.

In 1946 Seidlin and his colleagues[4] observed not only selective uptake of radio-iodine in metastases of thyroid cancer but also reduction in tumour size and marked improvement in the patient's general condition. A summary of the observations made since then at the Memorial Hospital, New York, has recently been published by Trunnell and his colleagues.[5] After performing a preliminary thyroidectomy in 23 patients they observed in 12 of them that the capacity of the one or more metastases to concentrate radio-iodine was considerably better after the normal thyroid had been removed. In three out of six patients whose normal thyroid tissue had been totally removed, treatment with thyroid-stimulating hormone resulted in an increased uptake of radio-iodine in the tumours. No such effect has been noted without preliminary removal of the normal thyroid. Ten patients with metastatic lesions which had acquired, after thyroidectomy, a reasonable ability to take up iodine were treated for from several weeks to months with thiouracil and propyl thiouracil; in seven of them there was a marked increase in iodine uptake when administration of these drugs was stopped. Nine of their patients with functioning metastatic carcinomas of the thyroid had intensive radio-iodine treatment, with definite improvement in four. Certain toxic effects resulted: hyperthyroidism in three; amenorrhoea in three women under the age of 41; and some depression of haematopoiesis in all.

Isolated reports of successful treatment are now appearing from a number of different centres. Freedberg and his colleagues[6] from the Beth Israel Hospital, Boston, described the discovery of a metastatic lesion in the right lung of a boy of 14 one year after the removal of a papillary carcinoma of the thyroid. The opacity seen in the radiograph of the lungs disappeared after treatment with radio-iodine, and at the time of reporting, 12 months from the first treatment, the boy was well. Walton[7] has recently reported from the Royal Cancer Hospital the case of a girl of 20 with a fixed thyroid mass, hard lymph nodes in the neck, and multiple secondary deposits throughout both lungs. A tracheotomy had to be performed before treatment could be started. After the administration of radio-iodine the mass in the neck and the lymph nodes both regressed and the tracheotomy was closed. Treatment was continued, since some signs of iodine uptake persisted in the chest. A further report on this patient was given at the International Congress of Radiology in London last summer; at that time, 18 months after treatment, she was well, and there were no radiological abnormalities apparent in the lungs.

This new method of radiotherapy is still in an early stage of development, but it seems that radioactive iodine has a useful though limited application in the treatment of metastatic thyroid carcinoma. Occasionally it undoubtedly offers these patients an effective method of treatment, better than anything previously available to them, which can bring about sufficient regression in multiple metastases to allow them to return to normal health for a while at least. The evidence now slowly accumulating should in time lead to a better understanding of the ways in which selective uptake of iodine in thyroid tumours may be increased and a surer assessment of the long-term possibilities of this treatment.

1 *Arch. klin. Chir.*, 1894, **48**, 489.
2 *Univ. Calif. Publ. Pharmacol.*, 1940, **1**, 339.
3 *Science*, 1942, **95**, 362.
4 *J. Amer. med. Ass.*, 1946, **132**, 838.
5 *J. clin. Endocrinol.*, 1949, **9**, 1138.
6 *J. Amer. med. Ass.*, 1950, **144**, 16.
7 *Brit. J. Radiol.*, 1950, **23**, 559.

PLASMA INSULIN IN DIABETES

In any endocrine disorder there are always two possibilities to be considered—an abnormal production of the hormone concerned or an abnormal response on the part of the target organs. The best evidence of an abnormality of hormone production is the demonstration of abnormal amounts in the blood; on the other hand, the finding of normal amounts in an endocrinopathy suggests abnormality of target-organ response. We are, as yet, a long way from being able to determine normal and abnormal blood levels of most hormones, but, so far as insulin is concerned, it would seem that a notable advance has been made. In this week's *Journal* (p. 732) we publish a short but highly significant paper by Drs. J. Bornstein and R. D. Lawrence on the measurement of the plasma insulin in two clinically different types of human diabetes. The technique of plasma-insulin assay was developed by Dr. Bornstein[1] and consists in measuring the fall in the blood sugar after injection of the plasma to be tested into alloxan-diabetic rats which have had their pituitary and suprarenal glands removed: the results are compared with a standardization curve previously obtained by injecting crystalline insulin into the same rats. By this ingenious technique all the known endocrine regulators of carbohydrate metabolism are removed from or rendered functionless in the test animals; as might be expected, such an animal has a highly labile blood sugar and is therefore extremely sensitive to insulin. Quantities as little as 1/2,000th to 1/20,000th of a unit of insulin could be detected. Obviously the test requires great technical skill and experience.

The results now reported with this method of assay are of outstanding interest. Dr. Lawrence, with his immense experience of diabetes mellitus, has already put on record in this *Journal* his view that there were two main clinical types of human diabetes, one certainly associated with insulin deficiency and the other, characteristically found in obese middle-aged patients ("lipoplethoric diabetes," he calls it), probably without insulin deficiency.[2] He wrote then, "I know that my speculation on their aetiology rests on no sound basis. Further investigations are required. . . . The difficult estimation of blood insulin in various types would give the clearest answer, and seems to be near realization."

Such realization, having now been achieved, seems thoroughly to confirm Dr. Lawrence's view, for he and Dr. Bornstein have been unable to detect any insulin in the plasma of five patients of the first type, with severe diabetes and ketosis, while in all of five obese diabetics without ketosis (of the second type) measurable quantities of plasma insulin, ranging from 0.19 to 0.29 milli-units per ml., were found. These values, it is interesting to note, are very similar to those found by Dr. Bornstein in normal human subjects under similar conditions.

1 *Aust. J. exp. Biol. med. Sci.*, 1950, **28**, 87, 93.
2 *British Medical Journal*, 1951, **1**, 373.

MODERN TREATMENT OF TRACHOMA

One of the outstanding advances in ocular therapeutics in recent years has been in the treatment of trachoma. The virus which causes this disease was originally described by Halberstaedtar and Prowazek, but its exact nature is not yet decided. Trachoma is responsible for more blindness than any other ocular disease (in some countries 80% of the population suffer from it), so that improved treatment is of great preventive as well as therapeutic importance. In this country trachoma is fortunately now a rare disease, especially in its primary or early stages, and opportunities for experimental treatment are few. But all over the world, wherever the disease is common, numerous observers have been reporting successful results with sulphonamides and, more recently, with some of the antibiotic drugs. Elsewhere in this issue Mr. V. Tabone describes the benefits achieved by a vigorous campaign against the disease in the island of Gozo near Malta.

The modern treatment of trachoma has recently been reviewed by Freysche,[1] who gives no less than 194 references in his paper. He states that the sulphonamides, tyrothricin, and penicillin have proved their efficacy, but that they cannot be regarded as specific in the present state of knowledge; that streptomycin is of secondary value only; and that very favourable results have been reported with "aureomycin" and chloramphenicol. Siniscal[2] has discussed the results obtained with sulphonamide drugs in 3,000 cases treated at the Missouri Trachoma Hospital. He found that local application with drops was more effective than systemic therapy, but that a combination of the two was best. The routine treatment he favours is the instillation into the conjunctival sac of a 10% solution of sodium sulphacetamide (or "gantrisin") every two hours, sulphacetamide ointment (10%) being applied to the conjunctival surface at night, together with the administration of sulphadiazine or other sulphonamides by mouth for one week. Symptoms and signs in a newly infected case of mild or moderate severity usually subside in ten days to three weeks, but in severe infections treatment may take months. Resistant cases, after six weeks on local sulphonamide treatment, are given an intermediate course of silver nitrate drops (0.2%) in the morning, followed by zinc sulphate drops (0.125%) every two hours.

It is not yet possible to say how important a part the new antibiotics may play in the cure of trachoma, for too few cases have so far been investigated. Duke-Elder, Ainslie, and Boase[3] reported remarkable success in a very small series treated with aureomycin drops, and similar encouraging results have been obtained by Moutino, Grilo, and de Moura.[4] More recently Boase[5] has described his investigation of 36 cases. He was impressed by the rapid relief of symptoms compared with other methods of treatment. In a long experience

1 *Bull. World Hlth Org.*, 1950, **2**, 523.
2 *Amer. J. Ophthal.*, 1950, **33**, 315.
3 *Brit. J. Ophthal.*, 1950, **34**, 30.
4 *Gaz. méd. portug.*, 1949, **2**, 497.
5 *Brit. J. Ophthal.*, 1950, **34**, 627.
6 Ibid., 1951, **35**, 50.

of trachoma he has found aureomycin superior to any other drug, but it remains to be proved whether or not it has a specific effect. Shah[6] has recently found that, although aureomycin controlled the symptoms of the disease, it had little effect on the trachomatous pannus in most of his cases. An event of the first importance in the war on trachoma is the start at the end of last year of a scientifically controlled campaign under the aegis of the World Health Organization for treating trachoma in the eastern Mediterranean countries with chloramphenicol, terramycin, and aureomycin. This very important work is under the direction of Professor G. Bietti, of Parma University, and perhaps from its results a standard method of treatment may be devised which will lead to the disappearance of this most serious disease.

DANGERS OF HYDROFLUORIC ACID

Hydrofluoric acid is already well known as an etching agent in glass-works and in the pottery and china industries, and it is also becoming essential in the oil industry in the production of certain motor fuels, in the engineering industry as a rust and scale remover, in the development of new plastic materials, in silk dyeing, and for the manufacture of refrigerants. Its use is growing also in many other spheres of industrial life. The manufacturers are familiar with its intense corrosive action and toxicological properties and treat it with the respect which is its due, but it is doubtful if small-scale users always pay as much attention to safety precautions as they should. Moreover, few medical officers are likely to have experience of the specialized treatment necessary in hydrofluoric acid burns, and will not realize that its corrosive action differs greatly from that seen with all other acids and alkalis.

Mr. R. H. Dale, reporting a case elsewhere in this issue, describes the severe and progressive effects which can result from a short exposure to hydrofluoric acid, and draws attention to the need for early and efficient treatment by injection of 10% calcium gluconate into and beneath the burned area. This injection is necessary to prevent extension of the necrosis underneath the surface coagulation, through which no external medication will penetrate, and is frequently a painful procedure, but the relief it brings to the patient is immediate. It is so important to obtain complete infiltration of the burned area that anaesthesia, either local or general, must be used without hesitation if there is any possibility of the patient being uncooperative because of pain or fear. American authors describe the treatment of moderately severe burns by soaking the burnt area in 70% alcohol and ice for one hour. This is stated to relieve pain and delay spread of the fluorine ion by closing the lymph channels and allowing diffusion of the fluorine into the alcohol. Magnesium oxide paste is of value only on small burns caused by very weak hydrofluoric acid, although it is often massaged into the surface coagulum of a more severe burn as a first-aid measure, and is used as a dressing after treatment with 10% calcium gluconate.

The acute irritant effects of hydrofluoric acid are not limited to the skin, but may also cause tracheitis, bronchitis, pneumonitis, or pulmonary oedema from inhalation of the vapour. Fluorine gas causes the same acute respiratory irritation, and, in contact with moisture on the skin or in the air passages, is quickly converted to hydrofluoric acid with resulting corrosive action. Oxygen inhalation for prolonged periods is the only effective method of treatment in the early stages of gassing. Burns of the eyes must also be anticipated, though they should not occur if proper protection with goggles or visor is provided. It seems probable that any burns of the cornea from such corrosive material would result in permanent scarring or blindness. These acute hazards are the most evident, but it should not be forgotten that repeated inhalation of small quantities of weak concentrations of hydrofluoric acid vapour may lead to absorption of fluoride ion, and the danger of fluorosis therefore exists. Operatives working over long periods with this material should be kept under observation and radiographed regularly if fluorine in excessive amount is found either in the atmosphere of their workplace or in their urine.

THE BLOOD PRESSURE OF SCHOOLBOYS

A rather unusual investigation has been undertaken in some schools in Leicester. Dr. L. Hahn[1] measured the blood pressures of 770 schoolboys between the ages of 11 and 15 under more or less standard (but not basal) conditions. The average pressure before puberty was 108/62 at the age of 11, 111/64 at the age of 12, and 110/62 at the age of 13. At or after puberty it was 118/68 at the age of 14 and 120/68 at the age of 15. Thus there seemed to be a sharp rise of blood pressure occurring at puberty. If the normal systolic pressure for boys of 11–15 is 90 to 130 mm. Hg, then the incidence of systolic hypertension rose from 4.6% in the boys aged 11–13 to 16.2% and 26.6% in the boys of 14 and 15 years respectively. If the upper limit of normal is placed at 139 mm. Hg, then the incidence of systolic hypertension in the three age groups becomes 1%, 5.6%, and 7.9% respectively. Unfortunately there were only 19 boys in the 13-year-old group. This compares very unfavourably with the relatively large numbers at other ages. If the average figures for the 13-year-olds are misleading, the whole thesis collapses. If, for instance, the average systolic pressure for this group was really 114 instead of 110, then from the age of 11 to 15 the average systolic pressures would become 108, 111, 114, 118, and 120.5, which is remarkably close to an ascending progression of 3 mm. Hg for each additional year of age. In this limited investigation Hahn did not attempt to find the incidence of hypertension in the parents of the boys, and follow-up studies are not, of course, available. Whether or not there is any relationship between puberty and hypertension remains to be demonstrated.

[1] *Med. Offr*, 1951, **85**, 43.

REFRESHER COURSE FOR GENERAL PRACTITIONERS

COLLES'S FRACTURE

BY

H. OSMOND-CLARKE, C.B.E., F.R.C.S.

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In 1814, more than 80 years before the discovery of *x* rays, Abraham Colles, a distinguished Dublin surgeon, described a fracture in the region of the wrist-joint. No more accurate or vivid account of this fracture has since been written, and to this day it is known as Colles's fracture in almost every country. In youth the corresponding injury, much less frequent, is "separation of the lower radial epiphysis." Though so described, it does not occur through the epiphysial line—it is a fracture through the metaphysis immediately adjacent to the epiphysial line.

Of all bony injuries, Colles's fracture is by far the commonest, forming about one-eighth of the indigenous fracture material in any large community. It occurs twice as frequently as all other fractures in the region of the wrist-joint. Women from middle age onwards are most often affected.

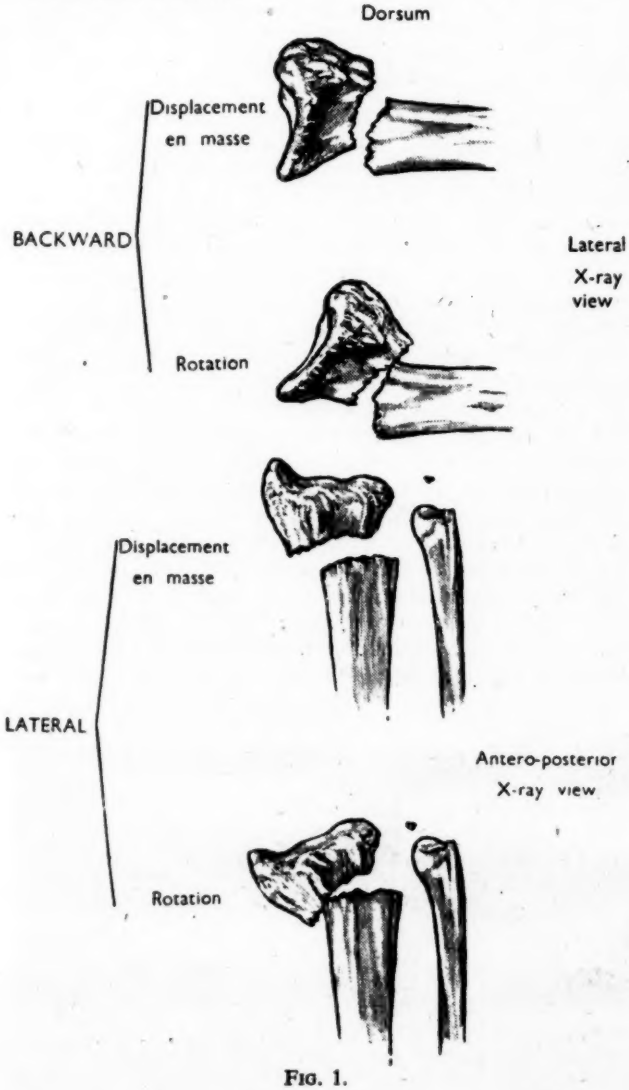

FIG. 1.

Anatomy and Mechanism

Colles's fracture is a fracture through the radius within 1 in. (2.5 cm.) of its carpal extremity, produced usually by a fall on to the palm of the outstretched hand. The distal quarter of the radius, though its broadest portion, is actually the weakest, as it is composed mainly of cancellous bone.

Comminution often occurs, and varies from gross fragmentation of the distal fragment to slight crumbling of the cortex on the dorsal aspect of the fracture. The line of fracture frequently involves the inferior radio-ulnar joint and occasionally the wrist-joint. In about half the cases the styloid process of the ulna is also broken.

The common displacement conforms to a more or less constant pattern and is illustrated in terms of the distal fragment in Fig. 1. A combination of backward displacement and rotation of the distal fragment (Fig. 2) is the most frequent happening. It is important to notice how this alters the inclination of the distal articular surface, which then looks distally and backwards instead of distally and forwards. If such a displacement is allowed to persist the wrist will be unsightly in appearance and its function may be impaired.

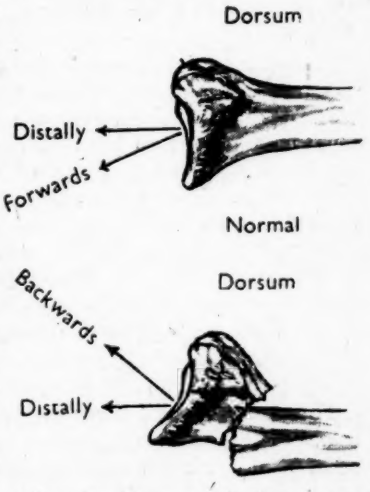

FIG. 2.—Common displacement in Colles's fracture: lower fragment displaced and rotated backwards. Note inclination of distal articular surface compared with normal.

In the older writings there is considerable controversy concerning the occurrence or not of true impaction of the fragments. In many of these fractures there is not the slightest doubt that the dorsal cortex of the proximal fragment becomes entangled in the cancellous network of the distal fragment. The realization of this fact is important in determining the manœuvres necessary to effect reduction.

Diagnosis

The clinical picture is extremely characteristic and varies in different patients only in degree (Fig. 3). To quote Colles: "The posterior surface of the limb presents a deformity; for a depression is seen in the forearm, about an inch and a half above the end of this bone (radius) while a considerable swelling occupies the wrist and metacarpus. Indeed the carpus and base of the metacarpus appear to be thrown backwards, so much

as on first view to excite a suspicion that the carpus has been dislocated forward. On viewing the anterior surface of the limb, we observe a considerable fullness, as if caused by the flexor tendons being thrown forwards. This fullness extends upwards to about one-third of the length of the forearm, and terminates below at the upper edge of the annular ligament of the wrist. The extremity of the ulna is seen projecting towards the palm and

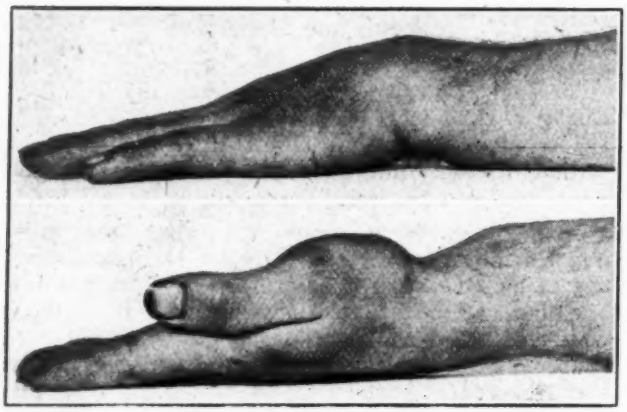

FIG. 3.—Colles's fracture: typical dinner-fork deformity.

inner edge of the limb; the degree, however, in which this projection takes place is different in different instances."

Tenderness and loss of function are well-marked features. An alteration in the relationship of the radial and ulnar styloid processes, whereby the former comes to lie at the same or at a higher level than the latter, sometimes takes place, but it is plainly obvious only in those comparatively rare fractures in which lateral displacement and rotation are pronounced. Of far greater significance is the loss of the normal anterior concavity of the lower third of the shaft of the radius. The slightest amount of backward displacement or rotation of the distal fragment in Colles's fracture is sufficient to obliterate this concavity—a fact which is readily verified by comparison with the uninjured limb.

The *x*-ray picture confirms the diagnosis and gives useful additional information concerning the exact amount of displacement, the degree of comminution, etc.

Treatment

As this fracture is so common among housewives, and as imperfect treatment of it can result in much discomfort in the performance of ordinary domestic duties, it is important that treatment should be adequate. There is a common but quite mistaken belief that Colles's fracture is the easiest of all fractures in which to obtain a perfect cosmetic and functional result. Fortunately, the persistence of some deformity is sometimes compatible with satisfactory function, for even in the best-organized fracture clinics and in the most experienced hands some 10 to 15% of patients are left with a certain amount of deformity.

When significant displacement is present, and it usually is, reduction should be effected as soon as possible under anaesthesia—preferably general anaesthesia if the patient's condition permits. The fragments must be disentangled, reduced, and splinted. The following steps in sequence usually prove successful in fulfilling these requirements:

1. Grasp each fragment firmly, one in each hand.

2. Exert strong traction and counter traction to disentangle the two fragments.

3. Steady the proximal fragment and push the distal one towards the volar aspect and then towards the ulnar side, maintaining traction all the while. This procedure has corrected the deformity when the wrist looks normal and when the normal anterior concavity of the radius has been restored.

4. The final manœuvre is to force pronation to restore the normal alignment of the inferior radio-ulnar joint.

5. Over a *thin* layer of padding apply a light plaster-of-Paris strip extending from the elbow to the knuckles on the dorsal aspect, encircling two-thirds of the circumference of the limb, and mould it closely around the site of fracture (Fig. 4). The splint is completed by a few circular plaster-of-Paris bandages. If there has been marked radial displacement or if comminution is severe the thumb should be included as far as the proximal interphalangeal joint. During the application of the splint, and while it is drying, the fracture is controlled by the individual who has reduced it. The hand is maintained in slight palmar flexion and ulnar adduction—that is, a position which opposes recurrence of the deformity. The arm is supported in a sling for the first twenty-four hours. Occasionally there is considerable swelling of the fingers. In these circumstances the hand should be elevated and a very close watch kept on the circulation. Plaster splints applied too tightly or which become too tight as the result of swelling cause pressure sores and even severer vascular catastrophes.

A radiograph should be obtained as soon as possible to confirm the efficacy of the reduction (Fig. 5). When the plaster is dry (in about twenty-four hours), and if the circulation in the fingers is normal, the sling is discarded and the patient carries out full movements of the fingers, elbow, and shoulder constantly. But it is important to demonstrate what is meant by *full*, because many patients are too scared to do more than keep the arm always at the side and simply "twiddle" their fingers. The fingers must be fully extended, adducted, and abducted; the finger-tips must be curled into the palm to flex the interphalangeal joints, and they must reach the thenar and hyperthenar eminences to keep the metacarpo-phalangeal joints supple. The elbow is flexed and extended. The shoulder is kept mobile by elevating the arm alongside the head, by touching the back of the neck (external rotation), and by trying to touch the back of the shoulder-girdle with the tips of the fingers (internal rotation). It must be insisted that these movements are carried out for five minutes every waking hour in addition to the performance of the simple tasks of everyday life. In fact, many housewives are

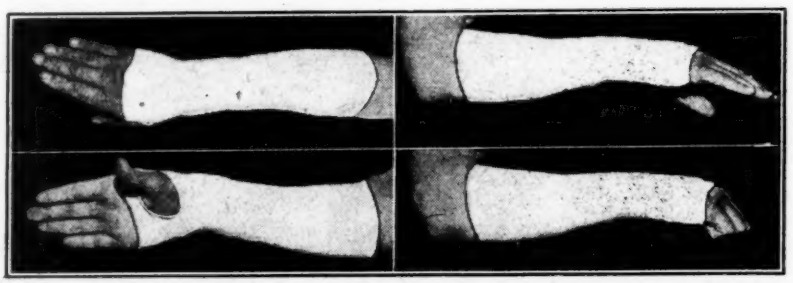

FIG. 4.—Plaster-of-Paris splint for Colles's fracture, well moulded around the fracture site and allowing free movement of elbow and fingers.

able to do most of their household duties throughout the period of treatment.

At the end of ten days a fresh plaster-of-Paris splint is applied, for by then the swelling of the soft parts has disappeared and recurrence of deformity can occur because the original splint no longer fits the limb accurately. This second and any subsequent plaster may be applied directly on the skin. Another radiograph confirms the maintenance of the correct position of the fragments. Radiographs are taken every ten to fourteen

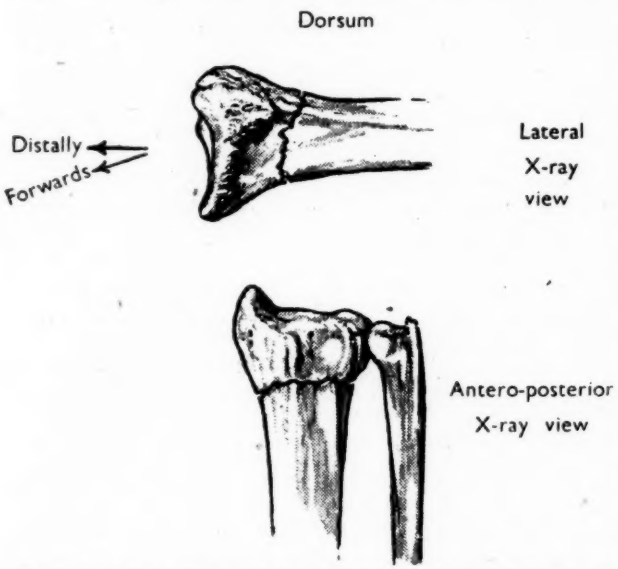

FIG. 5.—Illustrating standards of complete reduction of Colles's fracture. The fragments are in normal apposition and the radial articular surface is inclined correctly.

days, so that recurrence of deformity can be appreciated early and corrected if need be.

At the end of six weeks the fracture is invariably united, the splint is discarded, and a confirmatory radiograph obtained. Elderly apprehensive patients appreciate the support of a few turns of crêpe bandage for a week or so until they have gained confidence in the wrist. A few weeks later full movement of the wrist is restored by constant use, with or without the aid of physiotherapy. A competent masseuse is a great help, particularly in demonstrating the active movements necessary to mobilize the wrist and inferior radio-ulnar joints, and in encouraging patients to perform these exercises regularly.

Complications

Impairment of the Circulation.—It is of the greatest importance to observe the circulation and the sensation in the fingers at least twice a day for the first four or five days. If there is *any* doubt the plaster splint should be split; if this procedure is not followed by an *unquestionably* satisfactory circulation within half an hour the splint *must* be removed. The fracture can be re-reduced, but circulatory changes, once firmly established, tend to be irreversible, with tragic results—for example, local pressure sores, stiff numb fingers, or even gangrene of the fingers.

Recurrence of the Deformity.—This unfortunately occurs more often than surgeons think—or like to think. It is sometimes unavoidable because of the severe comminution of the cortex on the dorsal aspect of the fracture. In many patients it is due to failure to renew the splint as the soft-part swelling subsides. It is wise to reapply the plaster at the end of ten days and again in another ten days, because it is about the third week after reduction that deformity tends to recur. Minor degrees of displacement are best accepted only if repeated radiographs show that the deformity is not gradually increasing. If the deformity is increasing a further manipulation is advisable.

Non-union of the Ulnar Styloid.—The styloid process of the ulna rarely unites by bone and sometimes causes discomfort for several months. None the less, the discomfort is usually only temporary, and there is no justification for pegging or grafting operations. Very occasionally it may be necessary to excise the loose fragment for the relief of persistent localized pain and tenderness.

Post-traumatic Osteodystrophy (Sudeck's Acute Bone Atrophy).—The common cause of stiff fingers after Colles's fracture is disuse—hence the importance of constantly urging the patient to keep all his joints supple. Sometimes within a few days of the injury, however, the fingers become swollen, mottled, and shiny, and *severe* pain is complained of when active or passive movements are attempted. In a short time the swelling is replaced by atrophy of the subcutaneous tissues, excessive sweating, and other trophic changes in the skin and nails. Radiographs show osteoporosis of extreme degree affecting chiefly the cancellous portions of the radius and ulna, the carpus, metacarpus, and phalanges. Indeed, these changes may extend to the elbow and shoulder. The cause of this syndrome is by no means clear. Some believe it is merely an extreme example of disuse. Others suggest a sympathetic-nerve disturbance—a local axon-reflex initiated by the injury. Whatever the cause, no specific remedy is available. The wrist must be splinted until the fracture is united and the fingers kept as mobile as possible by *active* exercises every hour. In time the bone atrophy disappears, but if the syndrome has been at all marked some limitation of wrist and finger movement is permanent.

Rupture of the Extensor Longus Pollicis Tendon.—This complication can follow any fracture of the lower end of the radius which involves the floor of the groove in which the tendon lies. It occasionally happens after Colles's fracture, and occurs any time from the third week onward—most commonly in the second or third month. The tendon is gradually frayed through by constant friction on the irregular fracture line. Eventually it gives way suddenly, often accompanied by a sensation of something snapping, and the patient is unable to extend the tip of the thumb, which remains in a flexed position. The best treatment is to transplant one of the two extensors of the index finger to the distal end of the ruptured extensor longus pollicis rather than attempt to suture the frayed ends of the damaged tendon.

Malunited Colles's Fracture

Even though there may be considerable deformity after a neglected Colles's fracture has united, the function of the wrist and hand is often surprisingly good, and treatment is not required. Occasionally an operation is necessary because of severe restriction of movement, for the relief of persistent pain usually in the region of the inferior radio-ulnar joint, and for cosmetic reasons in younger patients. The operations most often performed are osteotomy through the site of the old fracture (best done by the Jackson Burrows method) or excision of

the lower end of the ulna. Correction of deformity by manipulation is not usually possible after about one month.

Reversed Colles's Fracture

In this injury, more correctly known as Smith's fracture, the radius is involved at the same level as in Colles's fracture. The lower fragment is, however, displaced forwards instead of backwards, and the manœuvres employed to reduce it are the reverse of those described for the more common injury. As a rule the wrist is best immobilized in the dorsiflexed position.

HEALTH SERVICE COSTS

[FROM A SPECIAL CORRESPONDENT]

Some months ago it might have been possible to regard the estimates for the cost of the Health Service in 1951–2 with less uneasiness than had been felt in the past. Last spring the presentation of an enormous supplementary estimate for the year 1949–50, and the proposed further increase in the estimated cost for 1950–1, provoked the justifiable conclusion that the cost of the Health Service had got completely out of hand. The limit placed last April by Sir Stafford Cripps on Health Service expenditure has, however, proved this time to be enforceable. He then said that no increases over the estimates could be made in one branch of the Health Service without corresponding economies in other branches. No supplementary estimate was necessary for the year just ended, and in the new year, 1951–2, the increase in the estimated cost of the Health Service is only £5m. The comparative figures are shown in the following Table:

	£m.				
	1949–50		1950–1		1951–2
	Original	Revised	Original	Revised	Original
Net cost to taxpayer (i.e., after allowing for appropriations in aid) ..	260	359	393	393	398

The Ministry of Health's establishment of control over the Health Service's finances has, it is true, had unpleasant side-effects. General practitioners hardly need reminding that discussions on their claim to a higher capitation fee have still not begun. Other practitioners in the Health Service have had their fees reduced—in some cases justifiably. What all will deplore is the method used to control the expenditure by hospital boards and management committees, which has whittled away much of their independence in administration.

Yet the stability of Health Service expenditure might have been a cause for some satisfaction were it not for two interrelated factors: the new defence programme, which will make new demands on people's pockets, and the rising tide of inflation. It is possible that this year the Chancellor of the Exchequer will be able to finance the new burden that the defence programme will impose without big increases in taxation. He may, that is, rely on rising prices, particularly food prices, to cut people's purchasing power so that they have less money to pay for other things. Next week, when the Budget is introduced, the answer to this financial problem will be known. But in two years' time the amount of real resources to be absorbed by the new defence programme will be some £1,000m. to £1,200m. more than was absorbed in the financial year just ended. Since the total resources of the community cannot be increased by anything like the amount necessary to cover these extra demands of defence, it follows that the other claims on the national resources must be reduced. Of these other claims, the civil expenditure of the Government and the personal consumption of the people ought to bear the brunt of the economies.

Social Services

By far the largest part of the Government's civil expenditure is for the social services. Only about £600m. of the "ordinary" Budget expenditure in 1950–1 went on civil expenditure that also offers scope for economies—as distinct from the payment of interest on the National Debt. By contrast the social service expenditure, including the food and housing subsidies, that falls on the Budget is of the order of £1,500m. In addition there is some social service expenditure that falls outside the Budget and is met from the National Insurance Fund or out of the rates. The next Table shows the estimated cost of all the social services in 1950–1, including the amount that is financed outside the Budget:

	£m.
National Insurance benefits*	427†
Industrial injury benefits*	14
National assistance	91
Family allowances	62
Food subsidies	410
Housing	69
Child care	16
Education	356
National Health Service	**411**
	1,856

* Actual expenditure 1949–50. † Including contribution to cost of Health Service.

If the £40m. contribution from the National Insurance Fund to the cost of the Health Service is deducted from the figure given for national insurance benefits, it will be seen that the National Health Service is now the costliest of all the social services. This in itself makes it a target for economies. In addition it should be pointed out that, with the exception of the Health Service, child care, and education, the social services are what is generally known as transfer payments. They do not, that is, represent direct expenditure by the State on goods and services but transfer income from the pockets of some people to the pockets of others—or to other pockets of the same people. It will be generally agreed that this transfer involves all sorts of inequalities, distortions, and absurdities. But in a defence economy it is the consumption of goods and services that matters most, because what has to be done is the freeing of more goods and services for defence without recourse to the most painful way of doing it—that is, allowing those responsible for the defence programme to outbid all competitors.

The following analysis of Health Service expenditure should be read with this object in mind. It might have been possible, at least for a year or two, to have kept a ceiling on the expenditure on the Health Service and other social services without raising taxes or imposing a specific charge on the public who use the Service. But this possibility has been completely upset by the Korean war and the need for rearmament.

Cost of Main Branches

It is clear that, when the estimates for 1951–2 were framed, the Ministry of Health was still hoping that the *status quo* could be maintained. A 7% increase in the cost of the hospital service and an 8% increase in the cost of the pharmaceutical service are offset by reductions in the supplementary ophthalmic and dental services. The changes in the estimated gross cost of the main branches of the Health Service are shown below:

	£m.		
	1949–50*	1950–1†	1951–2†
Grants to local health authorities ..	15.4	18.4	18.6
General practitioner service	47.0	48.2	48.4
Pharmaceutical service	35.3	32.0	34.6
Supplementary ophthalmic service ..	24.1	28.1	18.6
Dental service	48.2	46.9	39.9
Grants to hospital boards	220.7	256.0	273.4
of which maintenance and running costs§	*210.0*	*244.3*	*259.7*

* Actual expenditure except for hospitals' maintenance, which is estimated. † Estimates. § Less "direct credits" (mainly recoveries from staff for board, lodging, etc.).

The estimates for 1951–2 have been presented in more detail than has been the case in the past. Thus, for the first time it is possible to distribute the expenditure of the local health authorities among their various services, though no figures are available for 1949–50.

Expenditure of Local Health Authorities*

	£m. 1950–1	1951–2
Health centres	†	†
Care of mothers and young children	9.3	9.4
Midwifery	5.0	5.0
Health visiting	2.7	2.7
Home nursing	4.2	4.3
Vaccination and immunization	0.5	0.5
Ambulance service§	7.9	7.9
Prevention of illness	1.7	1.7
Home helps	3.4	3.5
Mental health	1.7	1.8
Miscellaneous	0.2	0.2
	36.6	37.0

* Including estimated expenditure from rates. † Estimated at £51,000 in each year. § England and Wales only. In Scotland the ambulance service is paid for wholly out of taxes, and the cost is estimated at £750,000 in 1950–1 and £630,000 in 1951–2.

It would appear from the virtual stability of expenditure in the new financial year that no allowance has been made for the higher salaries agreed on for medical officers of health and to dentists in the service of local authorities. But what is most striking about the Table is the low expenditure on certain items of the local health authorities' services by comparison with the expenditure on other branches of the Health Service. The total of local health expenditure, in fact, amounts to only about £2½m. more than the cost of the pharmaceutical service. Expenditure on the prevention of illness, which includes aftercare, is less than £2m. By contrast, the expenditure on the ambulance service, which is really a by-product of the hospital service, amounts to nearly £8m.

The cost of the general practitioner service needs little comment here, since the discussions on remuneration will take place shortly. Obviously, even if the profession's claims are met only in part, there will have to be considerable additional expenditure on the service.

The estimate for the pharmaceutical service in 1951–2 shows a rise compared with 1950–1 in spite of the reductions in chemists' fees and the appeals for economies in prescribing. It is to be presumed that, when the estimate for 1950–1 was drawn up, the Ministry of Health was taking into account the proposed charge on prescriptions, which was later abandoned. Probably the estimate for this year shows a reduction on the actual expenditure in the year just ended.

This year's estimate for the pharmaceutical service shows how the total is made up—though no figures are available for comparison with previous years:

Pharmaceutical Service

	£m. 1951–2
(*a*) Payments to pharmacists	
Dispensing fees and rota payments	10.2
Cost of ingredients and allowance for containers	19.5
Allowance for overheads and profits	3.4
(*b*) Payments to doctors and dentists for the supply and dispensing of drugs, etc.	1.5
	34.6

A similar breakdown of expenditure is given for the supplementary ophthalmic service, and here a comparison is given with the previous year:

Supplementary Ophthalmic Service

	£m. 1950–1	1951–2
Fees to medical practitioners for sight-testing	1.3	1.4
Fees to ophthalmic opticians for sight-testing	3.5	3.6
Dispensing fees on glasses supplied	11.4	8.1
Cost of glasses supplied and repaired	11.9	5.5
	28.1	18.6

The interesting feature of this Table is that, in spite of reductions in sight-testing fees, the estimated cost of sight-testing is slightly higher in 1951–2 than in the year just ended, although the estimated cost of supplying and repairing glasses is almost halved. The Ministry of Health evidently thinks that there will continue to be a big demand for sight-testing (which is not surprising, since opticians give people a gratuitous reminder that their eyes should be retested after two years, and for retesting no certificate from a doctor is necessary) but that fewer spectacles will be prescribed.

The smaller estimate for the dental service in 1951–2 is accounted for by reductions in the fees of dental practitioners. It would have been valuable if the estimate for the dental service had been broken down to show the amounts attributable to, say, fillings and false teeth, respectively. The only information available on this point was given in a recent Parliamentary answer. It was then said that, on the basis of a sample, the £43m. payable to dentists in England and Wales in 1949–50 could be divided as follows: examinations, 5%; extractions, 6%; dentures, 61%; and conservative work, 28%. Probably an undue proportion of extractions and supplying of dentures fell to be done in the first two years of the service, which bore the brunt of many years of public neglect of dental treatment. Yet, even if the proportion of extractions and dentures together has now fallen to 50%, it will still mean that they will cost about £20m. in 1951–2. It is revealing to compare this sum with the £9½m. spent by local health authorities on the care of mothers and young children, which has to cover the cost of their dental treatments in the clinics.

Increase in Hospital Budget

The hospital service is the one branch of the Health Service in which the Ministry of Health has budgeted for a real increase—on the assumption, given above, that the apparent increase in the cost of the pharmaceutical service is illusory. It is worth noting which of the main items of the hospitals' maintenance expenditure are expected to increase this year. (The following Table is for England and Wales only, since the Scottish analysis of hospital costs is on a slightly different basis.)

Gross Hospital Maintenance Expenditure

	£m. 1950–1	1951–2
Medical salaries (including specialists)	28.9	26.9
Nursing salaries	49.8	55.5
Other salaries and wages	57.6	62.7
Provisions	22.8	25.9
Drugs and dressings	8.2	9.4
Medical and surgical appliances, etc.	6.9	7.0
Fuel, light, and power	10.8	11.2
Maintenance of buildings, etc.	9.9	10.3
All other	28.4	31.9
	223.3	240.8

It will be seen that most of the estimated increase in 1951–2 is accounted for by the higher cost of nursing and other salaries and by the higher cost of food. As against these increases, the salaries of the medical staff show a reduction of £2m. The item "other salaries and wages" deserves some comment. In the new estimates it is broken down in some detail, and separate estimates are given as follows:

	£m.
Ward orderlies and nursing attendants	6.8
Works maintenance staff	7.7
Laundry staff	2.8
Farm and garden staff	2.1
Administrative and clerical staff (other than for central administration)	7.6
Professional and technical staff	7.6
Catering officers, cooks, and kitchen staff	5.9
Other staff	22.2
	62.7

What must seem extraordinary is the large residual cost of "other staff," after all the other many groups have been excluded: it approaches the total cost of the salaries of the medical staff. If the public is asked to economize in its use of the Health Service, and perhaps to pay a charge in some of the branches, it has a right to ask that hospital boards and management committees should scrutinize their non-professional establishments more closely.

HEALTH IN SCOTLAND

LOWER TUBERCULOSIS DEATH RATE

The lowest recorded death rate from tuberculosis in Scotland was in 1950, though, as the Report for the Department of Health[1] points out, tuberculosis remains Scotland's most serious health problem. The death rate from respiratory tuberculosis in 1950 was 47 per 100,000, as compared with 60 per 100,000 in 1949, and 54 per 100,000 in 1939. The death rate from non-respiratory tuberculosis was 6 per 100,000 in 1950, 8 per 100,000 in 1949, and 16 per 100,000 in 1939.

The number of notifications remains high, partly because of intensified case-finding. The provisional number of new cases of respiratory tuberculosis notified in 1950 was 8,138, compared with 8,427 in 1949 and 4,659 in 1939. The most pressing need at present, says the Report, is for more staff, especially nurses. The number of staffed beds available for the treatment of respiratory tuberculosis at the end of 1950 was 5,220. This number was 325 (6.6%) higher than the corresponding figure for 1949. The total number of patients awaiting admission to sanatoria fell during the year by 574 from 2,877 to 2,303. Up to the end of the year 6,700 people had been vaccinated with B.C.G. vaccine. These people comprised nurses, medical students, and contacts living in tuberculous households.

Deaths from all causes during the first year of life were 39 per 1,000—the lowest on record—and the maternal mortality rate reached the low figure of 1.1 per 1,000 total births. The number of dysentery notifications (5,595) was higher than in any previous year, and more than double that in 1949.

The birth rate was 17.9 per 1,000 population, a decline of 0.6 from the 1949 figure. The crude general death rate was 12.4 per 1,000, compared with 12.3 in 1949.

The National Health Service

With the co-operation of the medical profession, efforts are being made to cut down extravagant prescribing. "The general standard of personal service given by doctors to their patients has continued at a high level." The erection of a health centre at Edinburgh was begun during the year.

The response to the Department's invitation to executive councils and other bodies to consider what could be done to develop group practice arrangements "has superficially been disappointing," but the idea is thought to have taken root. At the end of the year more than half of the general practitioners in the Health Service were practising in partnerships.

The cost of prescriptions rose again in 1950. Nearly 20,000,000 were issued—about four per head of the population and 3,000,000 more than in 1949. The average cost rose from 3s. 10½d. in April, 1949, to 4s. 2d. in April, 1950. The waiting period for spectacles had been reduced to about four weeks by the end of the year.

In the hospital services many detailed improvements have been made, and the Report states that a sense of proprietary interest in hospitals has grown up and with it a proper freedom in critical comment. "Austerity and inconvenience . . . which might formerly be endured are now legitimately questioned." The number of nurses increased during the year from 19,848 to 21,351—a record figure. Also a record was the number of student nurses—8,568.

[1] *Reports of the Department of Health for Scotland and the Scottish Health Services Council*, 1950. (H.M.S.O.)

The Report is critical of the local authority services. It says that there is need for fresh emphasis on the importance of prevention and promotion of health. All associated with local authority health departments should be able to feel that they are part and parcel of a health service which aims at eliminating disease and providing early diagnosis and treatment. "There are signs that local authorities have yet to appreciate the full scope of their powers and duties here."

Ambulances turned out on 351,580 occasions and travelled over 7,000,000 miles, carrying about 520,700 patients. Measures are being taken to cut down the use of ambulances. The air ambulance service, which is run by B.E.A. on behalf of the regional boards, flew 57,175 miles.

The Report of the Scottish Health Services Council recommends the extension of the appointments system for hospital out-patients, and says that the location of out-patient departments should be planned for the mutual convenience of patients and general practitioners. Expenditure on local authorities is noted as relatively small compared with that on other parts of the National Health Service.

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE

The annual meeting of the court of governors of the London School of Hygiene and Tropical Medicine was held on March 28. Sir Archibald Gray, chairman of the board of management, opened the proceedings and paid a tribute to the services of his predecessor, Sir George Elliston. He announced that Lord Milverton, chairman of the court, had retired from that position owing to the pressure of public work. Sir Cosmo Parkinson, who for more than 40 years has been associated with the Colonial Office, latterly as Permanent Under-Secretary of State for the Colonies, was unanimously elected in his stead. Dr. H. M. C. Macaulay, who retired by rotation, was re-elected for a further period of three years representative of the court on the board of management.

The Dean (Dr. Andrew Topping) submitted his annual report for the first year of his stewardship. He said that his printed report, which was in the hands of the governors, contained a great amount of detail, but there were only one or two points which he desired to stress. During the year, in order to foster *esprit de corps*, an association of old students had been formed, and up to now 1,000 names had been enrolled. It was hoped to have an open day at the school for old students who happened to be in this country.

Improvements in the Courses

The last two years had seen a complete change in the course for the D.P.H. It was now covering much wider aspects of social medicine than the old environmental hygiene. As a consequence the former public health laboratory had been discontinued. The real laboratory for social or preventive medicine was in the field, and students were now being attached to rural as well as to metropolitan and suburban communities as part of their studies. In addition, thanks to the generosity of the Rockefeller foundation, a very extensive investigation of health conditions in an area of Hertfordshire was about to start, in which students from the school would be associated with officials from local authorities. One group which would come under investigation were people who had been given housing priority on an L.C.C. estate. The preventive and treatment facilities in the area would also be investigated, and, what was perhaps of greater importance, the advantage which the people took of such facilities.

More than 50% of the students taking the D.P.H. came from overseas, especially from Ceylon, the bulk of the remainder being British doctors seconded from the Colonial

Medical Service and from the medical services of the armed Forces. One of the most important functions of the school was to act as a focal point for medical people all over the world. It was felt to be important that the school staff should so far as possible be familiar with the countries from which the students came, and it was hoped to send more and more of the staff overseas during vacations so that the teaching would not be academic but would have a strong practical bias. The facilities for clinical tropical medicine in London were still inadequate—a surprising position in a country with such great colonial and maritime connexions—but a new unit of 68 beds for clinical teaching and research was almost ready for occupation and would be opened on May 24.

DOCTORS AS PAINTERS

MEDICAL ART SOCIETY'S EXHIBITION

The Medical Arts Society was founded in 1935 and has over 100 members, many of whom are showing something in this year's exhibition of nearly 150 works at Walker's Galleries in Bond Street, which continues till April 14. The vast majority of the exhibits are landscapes, watercolours and oils being equally represented, and the level of technical achievement is high. Indeed, for the most part one has no feeling that these are amateurs, though the use of green defeats one or two painters, and closer examination occasionally betrays a poverty of colours or a weakness of form. Among the more successful No. 56, *Barbizon*, and No. 73, *Italian Monastery*, were particularly pleasing, and A. C. Dalzell's *Okapis* (No. 66) has imagination. With the possible exception of No. 70, *Anatomy Demonstration*, there is nothing in the whole exhibition to indicate that the painters are also medical men, unless it be the complete absence of nudes; and the scarcity of portraits is surprising. Many of these Sunday painters are intending chiefly to record their holidays, but there are a few who attempt something more (e.g., No. 69, *Riverside*) and deserve praise accordingly. One or two painters betray the influence of the New English Art Club—for instance, A. B. Hewlett (Nos. 53 and 65)—but most remain in the Constable tradition. In sum, if there is nothing here tremendously exciting—and who expects even a London consultant to astound the world of art?—there is nevertheless some good work and interest enough to justify a visit.

Reports of Societies

PATHOLOGY IN UNDERGRADUATE EDUCATION

At the annual general meeting of the Section of Pathology of the Royal Society of Medicine on March 20 the symposium on "The Place of Pathology in Undergraduate Medical Education" was opened by Professors W. G. Barnard, L. P. Garrod, and Clifford Wilson.

Professor W. G. BARNARD said the place of pathology was in the clinical period and throughout it. He defined in broad terms what he understood by pathology, including all the recently recognized divisions of the subject: it was a science with its own particular outlook on medicine. To try to teach too much in detail—for example, the appearances of all the kinds of tumours—was wrong; emphasis on general principles and the laws determining structural changes was wanted, and active processes as well as structure should be discussed, with the help of biophysicists and others. The introductory course now given in London at the beginning of the clinical period required a minimum of six months, and he advocated during the final clinical year a course of three months which, at St. Thomas's Hospital, was a voluntary clerkship occupying two afternoons in the week. This course had been very successful. Medical education had to provide a basis upon which prospective practitioners could build.

Professor L. P. GARROD discussed the place bacteriology should occupy. Ideally it should occur twice—in the preclinical course, and again later; but there was no time to teach it as a pure science, and of necessity it was studied in its applications. Should the bacteriologist or the teacher of public health tell students how bacteria spread in communities? He thought it was the bacteriologist's job. The principles of immunity and the methods of attaining immunization must be taught. England contained more objectors to immunization than any other country, and therefore the student should be taught the arguments in favour of it. It was important also to teach diagnostic methods, including the collection of specimens, and to give an idea of the time necessary to prepare a report. For practical work the student should be given genuine material (cultures of pathogenic bacteria) upon which to work, and he might then be able to carry out simple investigations himself in later life when skilled help was not available. He would be interested only if he made his own preparations, however imperfect these might be.

Lectures should enable the student to read his books intelligently. With more time and opportunity there might be improvements in teaching—for example, with the help of the cinema. He would like to use films extensively. This would also enable students to see material that they might otherwise never encounter. Such subjects as chemotherapy should be taught in co-operation with those in other branches of medicine.

Need for Integration

Professor CLIFFORD WILSON accepted that pathology was the basis of clinical medicine, and a fundamental discipline. The subject had grown enormously and was no longer in the student's view synonymous with morbid anatomy. Psychopathology and social pathology had appeared recently; Sir Thomas Lewis taught that pathology was the study of the manifestations of disease in the living body, and integrated the subject with clinical medicine. The integration of the teaching of pathology was desirable along three lines: with the clinician, the patient, and the student; in the lecture-room, the museum, and the post-mortem room. He would like to see the pathologists in the wards and clinicians demonstrating together with pathologists at a necropsy. Clinical medicine and pathology should not be taught as separate systems.

A patient's symptoms should be interpreted in terms of disordered function. Environmental factors and psychopathological considerations should be insisted upon in the instruction of students in disease processes—for example, in tuberculosis. In the teaching of morbid anatomy more attention should be directed to aetiological factors, with less emphasis on the terminal results. A more dynamic approach was needed.

The mental burden of the student should be lightened by selecting carefully what to teach and considering what its application might be. Four main points to bear in mind were:

Should there be a clinical as well as a preclinical course in pathology?

Should there be continuous teaching in pathology in the clinical period?

How much specialized pathology should be taught?

Who should determine the nature of the final examination in pathology?

Argument was strong for a preclinical course so that the student could get a concrete conception of the subject. He had to learn terminology, and also the normal was more clearly grasped if learnt in conjunction with the abnormal. He disagreed with Professor Barnard and thought it would be possible to give preclinical pathology to London University students by pruning the present preclinical curriculum.

Continuous teaching should be arranged in the museum and post-mortem room for all clinical years. In addition a *special course*, preferably for three months, was invaluable at a later stage. Then the various aspects of pathology could be linked with social pathology and psychopathology. This would aid understanding of aetiological factors.

Subsequent Discussion

Dr. J. M. ALSTON agreed with Professor Barnard that we had to prepare students for their role as doctors later. Tolstoy, in *War and Peace*, said the need of the sick man for the doctor was the need for his reassurance that something was being done, rather than for his medicine. Those responsible for teaching should form a committee and thrash out the synthesis of the curriculum among themselves. The essential position of pathology was guaranteed by common consent, as in the B.M.A. report, *The Training of the Doctor*. An early course in psychopathology would teach students how to approach and understand the patient's mind.

Dr. L. F. HEWITT said integration had been much talked of, but one was faced with the problem of examinations, and any change had to take into account the necessity for passing the final examination.

Professor R. CRUICKSHANK pleaded for the necessity of giving the student only what he needed for his future work and not unnecessary details. A team of teachers might undertake the integration of different aspects of disease—for example, by discussing pneumonia in a group before students. Preventive medicine had been badly taught in some centres, and should be approached through its epidemiological aspects. Also teachers should be taught how to teach—as by a course of training. In answer to the president, Professor Cruickshank said he felt this was a problem that had to be met individually.

Professor G. PAYLING WRIGHT favoured a course of pathology before any ward-work, as practised at the older universities, and continuous instruction throughout the clinical years.

Professor R. HARE discussed the difficulty of this continuous instruction. Clinical pathological conferences went some way to meeting the need. Instruction in antibiotics could be integrated with pharmacological teaching. Hygiene, public health, and preventive medicine also needed to be harmonized with bacteriological teaching. He questioned whether a separate department of preventive medicine was necessary.

Professor G. R. CAMERON said that with increasing experience he personally felt that lecturing was futile compared with rag-classes. He suggested that if lectures must be given they should be delegated to the clinicians.

Dr. F. O. MACCALLUM wanted emphasis on the practical aspects of pathology in teaching. The correct procedure for the collection of blood in syringes for serological tests provided an example. In his experience this was often done badly, so that the requisite investigations could not be made.

In reply Professor GARROD felt that much that had been advocated in terms of "integration" was completely impracticable simply because many subjects did not lend themselves to this form of treatment and staffing was inadequate. Professor BARNARD found himself in sympathy with Professor Cameron over the problem of lectures. Undoubtedly the rag-class could be of unique value as a method of teaching.

Summing Up

In the present reporter's view it was regrettable in this discussion that no contributions were made by chemical or clinical pathologists. It seemed largely to resolve into a conflict between the idealists, who wanted more "integration" than may at present be feasible, and those who felt that the student should be taught the practical applications of pathology at the sacrifice perhaps of a good deal of theoretical stuff.

Nova et Vetera

ANATOMY AT OXFORD

A Short History of Anatomical Teaching in Oxford. By H. M. Sinclair and A. H. T. Robb-Smith. (Pp. 81; 22 illustrations. 3s. 6d.) Oxford: At the University Press. 1950.

Oxford is a very important centre of anatomical teaching and research. Its school of anatomy has a long and, at times, honourable history. It had a brilliant period in the second half of the seventeenth century, an almost featureless gap during the eighteenth and the first half of the nineteenth centuries, when its best-endowed posts were filled by men often charitably described as "characters," and a revival about a hundred years ago from which arose the present imposing development. In 1950 Drs. Sinclair and Robb-Smith prepared at the Radcliffe Science Library a fine exhibition to illustrate the history of anatomy at Oxford. This happily overlapped the meeting of the International Anatomical Congress presided over by Professor Le Gros Clark, who appropriately writes a foreword to this beautiful booklet. A catalogue of the items displayed in the exhibition is appended.

The title-page is an adaptation of the *Syntagma Anatomicum* of Vesling (1598–1649), the last of the great Vesalian line at Padua. It represents two conspicuously robust Muses, of whom one embraces a vast tome while the other flourishes a surgeon's knife. Between them they display a dissection scene in the famous theatre at Padua where old Fabrizzi lectured while young Harvey listened. From Vesling, as the caption here tells, John Evelyn (1620–1706), of Balliol, bought the dried and mounted tables of vessels and nerves which passed from the Royal Society and then to the British Museum, and finally in 1809 to the Royal College of Surgeons, where they now are.

During the centuries the assignments of the endowments for anatomy at Oxford have so varied that it would be impossible to relate them in a short narrative. The authors have therefore set them out in tabular form. Among the brilliant names there are, for the earlier period, Harvey, Willis, Boyle, Lower, and Petty, and, for the later, George Rolleston, Burdon-Sanderson, H. W. Acland, H. N. Moseley, Arthur Thomson, and E. Ray Lankester. The pamphlet ends with a series of plates containing many striking figures. Of these perhaps the most interesting is Christopher Wren's drawing of the base of the brain, showing the "circle of Willis." The most beautiful is the portrait ascribed to Sir Peter Lely of Sir Thomas Clayton (1612–93), regius professor of medicine and reader in anatomy. He was "possest of a timorous and effeminate humour, and could never endure the sight of a mangled or bloody body." Others of his line had other grounds for avoiding the dissecting-room. Thus the first regius professor, John Warner (died 1565), "was a great intruder into ecclesiastical benefices and dignities." In addition to his professorship he was Canon of St. Paul's, Archdeacon of Cleveland, Warden of All Souls, vice-chancellor of the university, and holder of various other sources of ecclesiastical emolument.

The real father of the modern school at Oxford was Henry W. Acland (1815–1900). He was elected to a medical fellowship at All Souls, then "a club for young men of good family who had shown or were believed to possess some aptitude for work." When asked for permission to lecture to the students he was told that he might, provided that the lectures began at 6 a.m. He came under the influence of Richard Owen, who persuaded him to leave Oxford for Edinburgh. There he studied under Allen Thompson, Goodsir, and Christison. He returned to Oxford as reader in anatomy in 1845. The importance of the medical school really dates from his appointment as regius professor of medicine in 1857. The account of the struggles and final success of this remarkable man is among the pleasantest features of this charming and beautifully produced little volume.

CHARLES SINGER.

Correspondence

Voltaire's Character

SIR,—As one who has done a good deal of research into the biography of Voltaire, may I make one or two comments on Professor Manfred Bleuler's attempt at long-distance diagnosis of acromegaly in the author of *Candide*, as reported in your issue of March 17 (p. 580)?

My reason for wishing to do this is the growing tendency in "modern" literary criticism to confuse values by the assumption that all these interesting long-distance diagnoses have been scientifically confirmed. Some of these diagnoses might be correct if the biographical details upon which they are based were exactly true. Every one of the details given by Professor Bleuler is certainly subject to many different interpretations. Every one of them receives an emphasis quite disproportionate to the complete picture of Voltaire's very long, consistent, and on the whole extraordinarily healthy life. One or two of the biographical premises upon which Professor Bleuler bases his conclusions are certainly untrue.

It is true that Voltaire had a wide range of intellect; that he saw many sides of the complex world in which we live; that he was troubled by many doubts about the nature of the universe, in which, to most thoughtful men, there seem to be many contradictions; that he was moved to great indignation by cruelty and oppression; that he united the sensitive feelings of a poet with a vivacious wit; that he could be generous and, by materialistic standards, perhaps foolishly generous not only to his friends but to his enemies; that when viciously maligned he could sometimes retaliate in such a way that it was said of him: "This odd creature is dangerous; when attacked he defends himself." It is also true that he had many moods; so have all of us. He had some vanity; so have all of us. He was sometimes depressed; and so are all of us. He was sometimes guilty of sentiment; most decent people are. If Voltaire's exquisitely expressed sentiment touched with humour is a symptom of disease, what kind of disease must we attribute to the popular crooners who nightly wail upon the air like so many amorous cats? As to his features, it may be remarked that Henry VIII married Anne of Cleves on the strength of a portrait, but the portrait was deceptive and the prescription unsatisfactory.

As a man of science Professor Bleuler knows more about diabolic spirits than I do; but I have known some perfectly healthy people who are not wholly incapable of mischief.

It should be remembered that biographies of Voltaire have been falsified, not only by fierce controversialists, but by the absurd reliance placed upon malicious records faked by a discharged servant. In such circumstances the personality of almost any man, not to speak of a man whose characteristics were above the average in so many ways, could easily be distorted to fit a great many erroneous diagnoses. There is quite enough guess-work in history as it is, and even the most eminent historians will sometimes so exaggerate a single incident as to give it a quite absurd general significance. Macaulay, for instance, says of Voltaire's friend Frederick the Great, "When His Majesty took a walk, every human being fled before him. If he met a lady in the street, he gave her a kick. If he saw a clergyman staring at the soldiers, he administered a sound caning on the spot." The position of the spot may be scientifically ascertainable, but a long-distance diagnosis of this remarkable case might lead to some delightful conclusions.

To Carlyle (equally unreliable), Frederick the Great was an impeccable hero on all occasions.

I suggest that men of science would do a real service, both to history and to literature, if they would make it very clear that such diagnoses as that of Professor Bleuler, made across the centuries (on uncertain or false premises, with distorted facts brought from widely separated circumstances into a misleading aptness of juxtaposition), are not to be taken as a firm foundation for critical estimates. At their best they can only be taken as a humorous relaxation of the scientific mind, like the debate on the historical influence of the length of Cleopatra's nose.—I am, etc.,

Ventnor, Isle of Wight. ALFRED NOYES.

Industrial Health Investigations

SIR,—Your annotation on silicosis in foundry workers (March 10, p. 520) suggests that inconvenient physical examinations may contribute to a workman's reluctance to be examined in industrial health investigations.

In my experience it is ignorance of the purpose and methods of these examinations, rather than their inconvenience, which causes this reluctance. To ensure the co-operation of workers, their trade unions and managements must actively support the research. Every man must know its object and how he is to be examined. He must also trust the examiner to treat the results as confidential. Once the group, encouraged by their leaders, has supported the investigation, there will be few who will refuse, and all but a small proportion of these can be persuaded to co-operate by personal interview. All this takes time, but it is an essential preliminary to field investigations if conclusions of any value are to be drawn from them.

Doll and Avery Jones,[1] in their recent survey of the incidence of peptic ulcer in various occupations, had a refusal rate of less than 2% among more than 1,000 workers who were examined medically. They found that they had the best co-operation when the men knew the object of the survey and why they were being asked so many questions. Information was posted on official notice-boards, meetings were held, and managements and trade union representatives made announcements about the survey. Each employee was given a letter a few days before the work began.

We used similar methods in an investigation of more than 300 cotton workers and had a refusal rate of about 3%. All who refused came from a group of controls who had no obvious benefits from an examination which lasted nearly an hour.

It seems that it is the investigators and not the industrial workers who must be blamed for incomplete surveys. Management and workers will, in fact, put up with many inconveniences in the interests of medical research provided reasonable steps are taken to get their co-operation.—I am, etc.,

Manchester. RICHARD SCHILLING.

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1 *Occupational Factors in the Management of Gastric and Duodenal Ulcer, M.R.C. Spec. Rep. Ser. No. 276*, 1951, London: H.M.S.O. See also leading article in the *British Medical Journal*, 1951, 1, 463.

Potassium Permanganate as Abortifacient

SIR,—We were interested to read the contribution of Mr. J. C. Miller (March 10, p. 526) on the use of potassium permanganate tablets as an abortifacient. He mentions the absence of British papers on this subject. It is possible, however, that the use of permanganate is already widely known and recognized throughout the country. We encounter some 250 abortions each year, and for many years now have been seeing the effects of potassium permanganate burns of the cervix, vagina, and vulva in many of these cases.

The use of potassium permanganate as an abortifacient coincided with the presence of United States Servicemen in this area. The use of the tablets seems gradually to have become a piece of general knowledge among the armed Forces generally and also among the public. We soon found that it became necessary always to look for permanganate burns, and the clinical effects and appearances are exactly as described by your correspondent.

We have indeed had sufficient time to observe pregnancies which have continued in spite of the local corrosive effects, and three of these have required caesarean section on

account of extensive scarring and stricture formation in the vault and middle third of the vagina. Secondary haemorrhage does occasionally occur, and one patient required ligation of a large vessel in one of the fornices.

The corrosive action of potassium permanganate was at one time used by dermatologists to destroy certain tuberculides. It would seem, however, to be regarded as a simple and innocuous means of procuring abortion, and the sooner the dangers are realized the better. The tablets are readily purchased at any pharmacy, and no doubt it would be difficult to prevent their sale. We ascertained from one patient that they were being hawked outside an antenatal clinic.

We entirely agree with Mr. Miller that simple catgut suturing is sufficient in the way of local treatment in most instances.

As a method of procuring abortion permanganate is quite unreliable, but for the abortionist will guarantee the onset of bleeding—often, indeed, alarming.—We are, etc.,

S. HENDERSON.
Romford, Essex. JOHN D. WATT.

SIR,—I noted with interest the letter by Mr. J. C. Miller (March 10, p. 526). I had occasion some months ago to attend a young married woman who had received some help and advice from a friend at her works. The haemorrhage was so considerable before I arrived and the pregnancy such an early one that, with the voluntary confession on the part of the patient of a method as yet unknown to me for inducing abortions and a brief examination, I had little doubt that an abortion had actually taken place. Furthermore the fact that haemorrhage cleared rapidly and completely led me to suppose that the process was complete.

I was somewhat perturbed to discover several weeks later, having dismissed the matter from my mind, that the patient appeared to be pregnant, and this was confirmed with an Aschheim–Zondek test; the baby is now a reality.

The two conclusions I would draw here are (*a*) that permanganate of potash is an unsatisfactory abortifacient, and (*b*) that it is very easy to be misled into thinking that a severe haemorrhage in early pregnancy is the result of an abortion.—I am, etc.,

Wembley, Middlesex. M. E. ARNOLD.

Painful Swelling of the Hand

Sir,—The case reported by Mr. G. F. Rowbotham (March 17, p. 565) is of considerable interest both with regard to diagnosis and the result of treatment. Mr. Rowbotham arrives at the conclusion that the condition was one most like rheumatoid arthritis although a toxic brachial neuritis could not be excluded with certainty. From the description given the diagnosis is that of the "shoulder–hand" syndrome, alternatively known as reflex sympathetic dystrophy of the upper extremity. This condition has been fully described by Steinbocker, Spitzer, and Friedman (1948) and by Bayles, Judson, and Potter (1950). Indeed, a condition of great similarity is described by Paget (1864) resulting from lesions of the brachial plexus.

The present case would appear to fall into the group of "idiopathic" cases in the classification given by Steinbocker *et al.* (1948). Both the photograph of the hand and the *x*-ray changes described and displayed are in accordance with this diagnosis and the clinical description is characteristic, except perhaps for the rather long period of development. That the sedimentation rate was normal is strongly against an active rheumatoid arthritis or indeed an active arthritis of any sort. In the shoulder–hand syndrome the temperature of the swollen limb is raised, but unfortunately Mr. Rowbotham gives no detail of this. He most fortunately arrived at the treatment of choice for the condition. All writers on the subject agree that some form of sympathetic interruption is beneficial and sympathectomy is probably that most certain to achieve success. The method of action of these procedures is imperfectly understood, as indeed is the condition itself.

This syndrome is not widely recognized in Britain and yet it is undoubtedly more frequently met than diagnosed. At least five cases have been seen at this hospital in the past four months, and in all probability many others have been overlooked owing to the tendency to pigeonhole all cases under a known disease-entity, rather than to admit diagnostic defeat. Mr. Rowbotham is to be congratulated upon reporting such a case under the heading of "Painful Swelling of the Hand."—I am, etc.,

Paddington, W.2. G. S. C. SOWRY.

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Steinbrocker, O., Spitzer, N., and Friedman, H. H. (1948). *Ann. intern. Med.* **29**, 22.

SIR,—I was most interested by the report by Mr. G. F. Rowbotham (March 17, p. 565). The features of this case are similar to the series described by Steinbrocker (*Ann. rheum. Dis.*, 1947, **6**, 80) as "the shoulder–hand syndrome," with a painful homolateral disability of the shoulder and swelling and atrophy of the hand The condition may be mistaken for rheumatoid arthritis, periarthritis, scleroderma, scalenus anterior syndrome, post-infarction, sclerodactylia, or some other condition. Jespersen (*Ann. rheum. Dis.*, 1949, **8**, 220) has also discussed similar cases, which he labels periarthritis of the shoulder-joint with secondary reflex dystrophy.

In the majority of cases reported the condition has, I believe, been unilateral, its symptoms arising in the shoulder. Although this differs from the case reported by Mr. Rowbotham, the final picture appears to have been the same, and I feel that the shoulder–hand syndrome must be included in the differential diagnosis.

Spinal-nerve and sympathetic block has been used in the treatment of the shoulder–hand syndrome, and Jespersen has reported results in some 16 patients in which there was a 60% improvement.—I am, etc.,

London, W.1. DOUGLAS L. WOOLF.

Aureomycin in Ophthalmic Herpes Zoster

SIR,—Dr. A. Lanfranco (March 17, p. 585) rather suggests that aureomycin may act favourably in herpes. Some eighteen months ago you had a correspondent, whose reference I have mislaid, who suggested that crude liver extract was a likely form of treatment for the same condition. I used crude liver in three cases last year with a dramatic response in one only. Some five months ago I had a patient who complained of symptoms suggesting the onset of ophthalmic herpes, and, as he was a dentist and had some medical knowledge, he realized that a definite diagnosis could not be made until the eruption appeared. He agreed to have the crude liver, which, however, failed to stem the appearance of the eruption, which followed two days later. I then tried aureomycin, but the eruption spread during its exhibition. The condition developed into the worst case of herpes I have ever had the misfortune to attend, with severe irido-cyclitis and increased tension in the eyeball, which necessitated operation by an ophthalmic surgeon and has only now become reasonably normal.

I have always deprecated drawing deductions from isolated cases, particularly if a successful result is claimed; similarly, I would hesitate to condemn completely both liver and aureomycin as modes of treatment for herpes, but, before these rather expensive drugs are used on a wholesale basis, I think we are entitled to ask for better evidence than has so far been adduced.—I am, etc.,

London, W.1. WILLIAM W. FOX.

Variability of Sperm Count

SIR,—The paper by Drs. G. C. Kennedy, N. A. Richards, and P. M. F. Bishop (March 17, p. 559) encourages me to illustrate the extreme variability in seminal specimens by describing a case investigated several years ago. After the wife had failed to conceive for three years, both she and

her husband were examined. The report on a masturbation specimen of the husband's semen included the phrase "the specimen showed various serious abnormalities, which render the patient sterile."

The detailed findings of this specimen were as follows: volume, 3.3 ml.; *p*H, 7.6; count, 3 millions/ml.; morphology: majority of cells microsperms and 30% show additional abnormalities; motility, normal; viability, low.

Examination of the wife included lipiodol salpingography; one month after this test in November, 1937, she became pregnant. Neither wife nor husband received any treatment. Out of interest, further examinations of the husband's semen were made. The results, including those of the first examination, are shown in the Table. All

Date of Examination	Vol. ml.	Count millions/ml.	Abnormal Cells %	Initial Motility %	Viability
October, 1937 ..	3·3	3	70	68	Low
September, 1938 ..	5·1	110	5	85	High
December, 1938 ..	4·0	50	10	85	"
January, 1939 ..	4·3	130	13	—	"
February, 1939 ..	—	110	25	—	Low

examinations were made after at least three days' continence and, except for the second, were carried out by the same examiner. It is interesting to observe the great variability not only in the count but also in the morphology and viability.

The first pregnancy proceeded uneventfully and was followed by two other successful pregnancies five and nine years later.—I am, etc.,

London, W.8. JOHN YUDKIN.

Errors with the Haemocytometer

SIR,—Drs. G. C. Kennedy, N. A. Richards, and P. M. F. Bishop are to be congratulated on drawing attention in their paper on "Variability of the Sperm Count" (March 17, p. 559) to the wide range of sperm counts that can be obtained from the same man. They say in their discussion, "There is considerable variability innate in any haemocytometer count, however good the technique employed," and cite Fisher for further statistical evidence. May I draw attention to a paper by White (*Med. J. Aust.*, 1950, **2**, 434) which deals specifically with this problem of errors involved in the use of a haemocytometer? This article, in which the ranges of variability due to the method are clearly tabulated, gives further support to the argument of your authors.—I am, etc.,

Edinburgh. R. COLLIN.

Legal Responsibility of Hospital Managements

SIR,—Your medico-legal correspondent (March 5, p. 480) states that the liability of a local authority for the negligence of a house-surgeon employed in one of its hospitals was decided in the case of *Collins* v. *Herts County Council* (1947) K.B., 598. In that case the house-surgeon concerned was unqualified (and therefore unregistered), and was employed by the authority under wartime arrangements, a fact which might seem to place more responsibility on the employer than if the house officer were fully qualified and registered.

This case, however, now has only historical interest in view of the decision of the Court of Appeal in *Cassidy's* case (*The Times*, February 16). This decision confirms that a hospital authority is responsible by reason of its vicarious liability for the negligent acts in the course of duty of a resident medical officer, house-surgeon, or nurse employed by it. Moreover, Lord Justice Denning expressed the view in Cassidy's case that the hospital authority would be just as much responsible for the negligence of a consultant who is employed by it, irrespective of whether such employment was under a contract "of service" or "for services."

Although this point of law is now clarified it is important for doctors who are employed by hospital authorities to remember that even though the hospital authority is responsible (that is to say, may be held liable) for the negligence of its staff, that liability *is not exclusive* and does not relieve the individual, whose negligence has caused the injury, from his personal liability in tort.

In nearly all such actions brought against hospital authorities the individual doctor or surgeon concerned will be joined as a defendant. Moreover, it may well be that there will be a conflict of interest between doctor and hospital—e.g., where the question at issue is whether the negligence of the doctor or of the nursing staff caused the injury—and the defendants could not properly be represented by the same solicitors and counsel.

At the conclusion of the case the Court may be asked to apportion the damages between the various joint tortfeasors. If the whole blame were attributable to the doctor and the hospital authority was only responsible by reason of its vicarious liability for his acts, the Court would have jurisdiction to make an order against the doctor and in favour of the hospital authority for contribution amounting to a complete indemnity (Law Reform (Married Women and Tortfeasors) Act, 1935, Section 6 (2)).

Thus the decision in Cassidy's case (*supra*) does not in any way diminish but rather enhances the necessity for doctors employed in the hospital services (or indeed by other public authorities providing professional services to patients) to protect themselves against the risks of actions for alleged negligence, both as to damages and costs, by joining one of the recognized protection organizations.—I am, etc.,

ALISTAIR FRENCH,
London, W.C.2. Secretary, Medical Protection Society.

Ski-ing Injuries

SIR,—Your leading article on the subject of ski-ing injuries (February 24, p. 401) was no doubt of particular interest to many readers at this season. A ski-ing holiday is a strenuous holiday, altogether different from the *dolce far niente* holiday of summer in the country or by the sea. For this reason ski-ing must be recognized at once as a sport for the physically fit, and it must be accepted as a game in which there is inevitably some risk of physical injury. In general, however, these risks are greatly exaggerated.

The important consideration in the incidence of ski-ing injuries is that the great majority are sustained in the first three days of the holiday. You mention this, but I think you do not emphasize it enough. In those first days, be you novice or expert, your muscles are not yet toned up. Ski-ing requires a good deal of muscle tone in order to hold the skis in complete control in all positions. It also requires a good deal of muscle co-ordination in order to maintain body balance in the very quick changes of lateral swing and vertical undulation. I advise no one to go near a ski lift for those first three days. Save your money and spare your bones by climbing on skis and then ski-ing down, be it on the nursery slopes or on brief excursions. That is the best way to tone up quickly your thigh, leg, and foot muscles. Thereafter the risks of injury from falls are infinitely less.

More people ski on the *piste* than in the soft snow. *Piste* running gives the thrills of speed, but soft snow excursions give the ecstasy of real ski-ing. On the *piste* most accidents occur, but many are only minor. Numerically fewer accidents happen in soft snow, but when they do occur they are usually more severe.

Among all ski accidents, injuries to the ankle region far predominate over those of all other types. They vary from sprains to compound fractures. In most winter-sports villages the medical attention is afforded by one general practitioner. Many of these have studied and cultivated a good deal of experience of ski-ing fractures, but nevertheless they are far from expert by modern orthopaedic standards. Indeed, some are antique in method. If a general anaesthetic is required they may be further handicapped by the lack of anyone to give it other than an unqualified assistant.

My advice to anyone sustaining a fracture is to get immediate attention by the local doctor, with reduction if possible and the application of a split plaster. Then get as quickly as possible to one of the large Swiss city hospitals, or get home.

There are also certain precautionary factors concerned with the ski. With the modern Kandahar binding the boot is fixed firmly down on to the ski, for it is only with this rigid fixture that confident control can be obtained in fast downhill racing. Many trials are at present directed towards effecting a practical safety release for the foot during a fall, and so avoiding a fracture. But obviously this can be achieved only by sacrificing some of the security of the boot upon the ski.

I think the best device for minimizing accidents is the "instep strap." This does not approach the problem, as the safety release does, by aiming to protect the limb from a breaking-strain. It does so by helping to prevent *the awkward fall* which is the cause of the fracture. The instep strap passes from a loop in the Kandahar binding on one side, across the instep, around the boot, across the instep again, and down to the binding on the other side. This strap gives support at the point where the maximum aid is needed by the skier in fully controlling his skis in modern *Vorlage* technique.

—I am, etc.,

London, W.1. JAMES KEMBLE.

Low Spinal Block in Eclampsia

SIR,—Could not the spinal analgesic act favourably in eclampsia by paralysing some of the abdominal and pelvic floor muscles and thereby permitting the intra-abdominal pressure to be lowered? Has pressure on the renal veins definitely been excluded as the cause of eclampsia? This simple theory can be made, on superficial examination, to account for all the manifestations of eclampsia; whether it be the susceptibility of the tight-muscled primipara and the American negress or the relative immunity of the lax-muscled multipara or mealy-fed African negress or the susceptibility of the mother with twins or hydramnios. (What happens to the pre-eclamptic with twins if one twin is born a day or two before the other?) Has anyone tried nursing the pre-eclamptic in the knee–elbow position with frequent enemas and an indwelling catheter to keep the fundus off the renal veins? Are the pundits bewildered by what, after all, may be only a "plumber's problem"?—I am, etc.,

Chasetown, near Walsall. C. R. HOUGHTON.

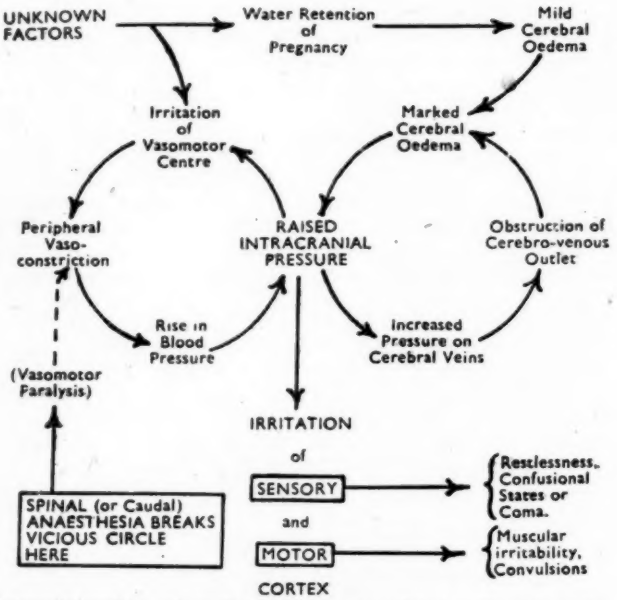
SIR,—Drs. V. H. Cooper and P. V. Lang (February 17, p. 338) are to be congratulated upon their demonstration of the value of low spinal block in the amelioration of the symptoms of eclampsia. As they wanted to know why so little "heavy nupercaine" achieved so remarkable a cure and no one else has replied, I venture to offer the following explanation.

When a mixed nerve is bathed in a low concentration of local analgesic solution a "differential" ("dissociated") analgesia results.[1] Fine (non- or slightly medullated) fibres are readily blocked, thick (heavily medullated) fibres are spared, and those between the two extremes are affected in an inverse proportion to their degree of myelination.[2,3,4] A simple instance is to perform a lumbar puncture, leave the needle in situ, and connect to it a slow drip of 0.2% procaine in isotonic saline; differential spinal analgesia[5] will be as follows:

Fibres blocked (diameter, 0.5–2 μ)	*Fibres spared* (diameter, 2–15 μ)
Vasomotor (B.P.)	Touch
Sudomotor (sweating)	Position sense
Visceromotor	Vibration sense
Pin-prick sensation	Pain other than pin-prick
Stretch Efferents (some)	Somatic motor

With a small dose of heavy nupercaine for spinal analgesia the rapidly injected drug produces a relatively high concentration in the cerebrospinal fluid in the lower part of the dural sac; as the drug diffuses upwards, however, its concentration rapidly decreases, and at certain levels the dilution is such that differential spinal block occurs. This accounts for the well-known phenomenon of sensory anaesthesia rising two or more segments higher than that of motor paralysis; also for the less well known fact that viscerosensory and vasomotor fibres are blocked to an even higher level. Hence a woman in labour given a heavy spinal while sitting up ("saddle-block") will cease to feel the pain of uterine contraction (viscerosensory fibres entering the cord at D10 and 11 and S2, 3, and 4) and may show a very slight fall in blood pressure (vasomotor fibres above L2), while skin anaesthesia is still limited to a small area around the anus and vulva (S3, 4, and 5). By placing their patient in a slightly "head-up" position after the giving of the spinal analgesic your correspondents obtained a differential spinal block with sufficient vasodilatation in the legs to relieve the high blood pressure (postural hypotension).

With regard to the spinal analgesic breaking the "vicious circle of rising blood pressure" in eclampsia,[6–11] may I suggest the following explanation? Unknown factors cause a vasoconstriction and raise the blood pressure; this combines with the slight cerebral oedema (probably present in the brain as well as the other tissues of those pregnant women who exhibit water retention) to raise the intracranial pressure. This pressure flattens the cerebral veins and delays the exit of blood from the brain with a still further increase in intracranial pressure. As the intracranial pressure mounts the various vital centres are first irritated and then paralysed from ischaemia, commencing with the vasomotor centre (raised blood pressure at first) and then passing on to the sensory (confusional states, coma, etc.) and motor (convulsions preceded by muscular irritability) centres. The accompanying *schema* tries to show how these factors are interrelated.



Interrelationship of various factors associated with eclamptic hypertensive encephalopathy.

It should also be noted that a *sympathetic block probably allows an opening up of a vast number of glomeruli which are out of action through spasm of their afferent vessels,* thereby countering the renal failure.[10] In addition the draining of blood to the legs reduces the pulmonary congestion which might lead to pulmonary oedema.[12]—I am, etc.,

London, S.E.5. A. H. GALLEY.

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Aneurysm or Angioma?

SIR,—Dr. A. Kahan's diagnosis of rupture of a berry aneurysm in the three cases of spontaneous subarachnoid haemorrhage in children (March 17, p. 567) should not pass unchallenged. Spontaneous subarachnoid haemorrhage is an uncommon condition in children, but in my own small series of cases haemorrhage around a haemangioma of the cerebral cortex of congenital type has been at least as common a cause as a rupture of a berry aneurysm. Neither diagnosis should be made on the clinical signs alone; cerebral angiography is necessary. The development of percutaneous injection of the carotid artery has made carotid angiography a much less serious affair than formerly, when open operation was necessary. I have been able to secure satisfactory pictures by the percutaneous route in children as young as 6 months, though I prefer surgical exposure of the artery in patients who are aged less than a year.

While the whole point of this letter is to suggest that angiography is necessary to establish the exact diagnosis in these cases, it is interesting to notice that in every one of Dr. Kahan's three cases there were residual neurological signs. This is certainly not the case in all nor even in the majority of cases of subarachnoid haemorrhage due to rupture of a berry aneurysm in adults, but is very much commoner after haemorrhage from a cortical angioma. —I am, etc.,

Manchester. A. N. GUTHKELCH.

A Cause of Emphysema

SIR,—Dr. K. Robson, in his excellent review of emphysema (March 10, p. 521), repeats the time-honoured explanation of inspiration being more powerful than expiration. A far more important factor in the production of emphysema, lung distension, and tension cavities is the change in the diameter of the bronchi and presumably the bronchioles on respiration. On inspiration the bronchi dilate, allowing free passage of air into the alveoli. On expiration the bronchi contract, making the return journey of the air far more hazardous. When the bronchi are further narrowed by swollen mucous membrane, secretion, and "spasm," expiration becomes difficult or impossible. This dilatation and contraction of the bronchi is probably passive and due to the elastic pull and relaxation of the lung on respiration. It can be observed bronchoscopically and the dilatation element demonstrated, in the temporary state in atelectasis, and in the permanent state in bronchiectasis, by "lipiodol."—I am, etc.,

Chichester. JOHN D. WHITESIDE.

Abrams's Box Revived?

SIR,—Recently I had occasion to see a hospital patient who had received a lumbar puncture the week before as a test of cure for well-treated lues. Following the test he developed a headache and could not rise from his bed. Claiming "that it was impossible to get a proper doctor to visit the home these days for a trivial condition like a headache," he was nursed by his wife. He told me that his progress was slow and after a day or two she met a fellow tenant in the hall of the same block of flats who was what is sometimes called "an unqualified practitioner." He accepted with alacrity the invitation to see the husband as an opportunity to display the virtues of his new diagnostic box. This was an electrical contrivance which, it was said, could "tune in to the wave band" of an individual person after a drop of blood had been collected for the purpose. Having done this it could further diagnose from what the patient was suffering, from abscess to zoster. My patient admitted to a history of the lues venerea, which enabled the practitioner to state from the figures produced by the box that he had either secondary syphilis or yaws. (Actually both his serum and spinal tests were completely negative.)

Prior to this experience I had heard say that a well-known London firm was interested in apparently similar diagnostic boxes which, when given a drop of blood, if I understood the claims correctly, could "tune in" to the patient at a distance of some miles, register abnormal waves due to disease, and even produce a photographic record of the diseased area. An inquiry to the firm in question confirmed their interest, but it was stated that the first of these boxes is not yet available for demonstration.

It was about the turn of the century that Abrams[1] produced his diagnostic box, embodying the very latest of electrical equipment. It too depended on a drop of blood, taken on a piece of filter paper, and, after an electrode was placed on the forehead of the patient and the abdomen solemnly prodded, an electrical reading (measured, I believe, in ohms of resistance) was obtained. Thus a diagnosis of cancer or tuberculosis could be confirmed.

In a recent article[2] discussing the future of quackery the writer considered that the end was near, as magic has now become rationalized and even penicillin ceases to excite our wonderment. However, as science advances, with the impossible being achieved almost daily, perhaps this is not so and the public is actually more gullible. Surely persons who gather round a box and watch a boat race at a distance of many miles are to be forgiven for considering that the mere diagnosis of disease in a patient connected by wires to another type of box in the same room is but child's play for the modern scientist. Thus there is a danger that the quacks will exploit scientific advancement as it occurs, and, who knows, "atomic boxes" are perhaps already in existence and an era of "fission faddery" on the way.

It is clear that all spurious claims should be exposed, not only to the doctors but to the patients themselves. The British Medical Association could do good service by examining the pretensions of those interested in this type of work, stating what nuclei of scientific fact, if any, exist in the claims and exposing those aspects which are patently false. They now have in *Family Doctor* a way of conveying such information to the public at large.—I am, etc.,

London, W.2. R. R. WILLCOX.

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POINTS FROM LETTERS

Thumb Sucking

Mr. J. H. BADCOCK (Bury St. Edmunds, Suffolk) writes: Apropos of the thumb- or finger-sucking habit mentioned in Miss L. Clinch's article on orthodontics (February 24, p. 406), it should be remembered that this is only one part of a syndrome, the other being the fumbling by the child's other hand of something soft and warm, a soft toy, the blanket, a "woolly" kept for the purpose (or sometimes its own hair), without which the child will not go to sleep. When trying to effect a cure this should always be looked for and when possible removed, possibly at the expense of one or two disturbed nights. I have known the deprivation of a "woolly" stop the habit without other means.

Corrections

Professor CHARLES WELLS and Mr. RICHARD WELBOURN (Liverpool) write: It has been pointed out to us that the statement in our paper (March 17, p. 553, para. (*c*)) that iron is excreted in the bile pigments is misleading. There is, of course, no iron in the bile pigments themselves, but (to quote Whitby and Britton) "it is logical to deduce that biliary iron excretion is entirely associated with pigment excretion and that the iron is bound to the pigment." Also, in the same paragraph the figures "about 5 mg." and "about 10 mg." should, of course, be "about 0.5 mg." and "about 1.0 mg.," respectively.

Drs. W. H. H. MERIVALE and L. FORMAN point out two errors in their paper, "A Case of Masculinovoblastoma" (March 17, p. 560). (1) The serum cholinesterase level given in Table I should read "Serum cholinesterase—105 µl./ml./minute." (2) In the references, the 17th reference should read "Novak, J. (1947). *Gynaecological and Obstetrical Pathology.* Saunders, Philadelphia and London."

Obituary

G. W. MITCHELL, M.D., D.M.R.E.

Dr. G. W. Mitchell, consulting radiologist to St. George's Hospital, died suddenly at his home at Gerrards Cross on March 19, aged 65.

Godfrey William Mitchell was educated at Rugby, Cambridge University, and St. George's Hospital, where he qualified in 1912. After holding various resident appointments he settled for a short time in practice near Cambridge. At the outbreak of the first world war he at once applied for a commission in the R.A.M.C. and served in France and the Near East till the conclusion of hostilities. On his return from the war in 1919 he graduated B.Ch. at Cambridge and proceeded M.D. in 1923. Relinquishing his general practice, he took up the study of radiology and adopted this branch of medicine as his career, after obtaining the D.M.R.E. in 1925. He held posts in the *x*-ray department of St. George's for many years, and on his retirement in 1938 was made consulting radiologist to the hospital, having been for some years head of the department. During the second world war, though in poor health, he resumed work in the Middlesex County Council hospitals and served throughout the period of the war.

A former colleague writes: As a radiologist Mitchell was meticulously accurate and painstaking in his work, and in his day was well known for his knowledge of the *x*-ray appearances of the rarer bone conditions. As a man he had great personal charm and was a delightful colleague to work with both in hospital and in his private practice—in the latter sphere he was at all times willing to help in the care of patients in poorer circumstances. In recent years he suffered much from ill health and for some time had lived in retirement in the country.

R. A. MACLAVERTY, M.B., F.R.C.P.I., F.R.C.O.G.

Dr. R. A. MacLaverty, professor of obstetrics and gynaecology in University College, Galway, died on January 23 at the age of 66.

Robert Ambrose MacLaverty was born in Whiteabbey, Co. Antrim, and was educated at St. Malachy's College, Belfast. He then studied medicine in Dublin and graduated M.B., B.Ch. from the Royal University of Ireland in 1908. Soon after graduation he was appointed assistant master to the Coombe Hospital, Dublin; after a period of three years as assistant, he went to Vienna for further postgraduate study at the Wertheim Clinic. Returning to Dublin, he took his M.R.C.P.I. in 1914 and was elected to the Fellowship in 1917.

In 1914 MacLaverty was appointed master of the Coombe Hospital. It was during the seven years of his mastership that the earlier promise of his outstanding gifts came to fruition. He was a brilliant teacher, an accomplished accoucheur, and an operator of great technical skill. Those who were his students at that time will recall how all these qualities were centred in a personality dynamic yet kindly, and for all its brilliance essentially simple and approachable. On the termination of his mastership of the Coombe Hospital he was appointed honorary consultant to that hospital, and he was also appointed to the staff of the National Maternity Hospital, Dublin. A Fellow of the Royal College of Obstetricians and Gynaecologists from its foundation in 1929, he was an extern examiner in obstetrics and gynaecology to the National University of Ireland, and examiner for the membership of the Royal College of Physicians of Ireland. After carrying on a large and successful private practice in Dublin, he was appointed in 1942 to the chair of obstetrics and gynaecology in University College, Galway, and obstetrician-gynaecologist to the Central Hospital, Galway. These positions he filled with distinction up to the end. He was universally beloved, and the people of the west of Eire mourn his passing. His courage and indomitable will to go on working during the last years of failing health were quite in keeping with the character of the man and his sense of dedication. He was sincere, ever loyal to his friends and colleagues, a gifted raconteur with a lively sense of humour, and a staunch upholder of the highest principles of the profession. To have known one of his stamp in passing through life is a privilege that will not come again. He is survived by his widow, a married daughter, and two sons, who are both doctors.—E. A. K.

The death of Dr. ANDERS LAMBERT WASSÉN occurred on January 16 in Gothenburg, where, since 1924, he had been in charge of the city's bacteriological laboratory. He was born in 1890, and he graduated as a doctor in 1914 at the University of Upsala. After serving as chief physician to the Swedish Red Cross expedition to Russia in 1921–2, he made his mark in bacteriology, and in 1934 was awarded the jubilee prize of the Swedish Medical Society. In 1936 the University of Lund conferred on him an honorary doctorate. The international reputation he enjoyed was founded on his valuable contributions to bacteriology and allied disciplines.

Dr. ERNEST TREVOR SHORLAND, a well-known Wiltshire practitioner, died at his home in Westbury on February 7 at the age of 78. The second son of the late Dr. E. P. Shorland, he was educated at Marlborough and Guy's. He was a good athlete and played cricket and Rugby football for both his school and hospital. Later he played cricket for Wiltshire. Qualifying in 1895, he held a resident appointment at Guy's, and shortly afterwards went out to South Africa as medical officer to the Royal Wiltshire Yeomanry. He remained with that regiment during the whole of its service in the South African war. On his return he joined his father in practice in Westbury, where he remained for the rest of his life. During the first world war he was the medical officer in charge of Heywood House Hospital. He held many public appointments in the area, including that of medical officer of health for the Westbury Urban and Rural District Councils. A magistrate for many years, he was for a time chairman of the Westbury bench and of the local juvenile court. He was president of the Wiltshire Branch of the B.M.A. in 1924–5. His work for the Westbury Cottage Hospital was widely appreciated: he was primarily responsible for the building of the first cottage hospital in the town as well as playing an important part in the design of the present hospital. His cheerfulness, kindness, and professional skill were qualities appreciated particularly by his patients. A colleague has written of Shorland that he was "an outstanding example of the finest type of general practitioner of the age preceding the Great War . . . he was regarded as a friend and counsellor by his patients and by many others in all walks of life who sought his advice in cases of difficulty and doubt." In 1907 he married Miss Grace Laverton, and to her much sympathy will be extended.

Professor HJALMAR HOLMGREN, whose death occurred on February 21 at the early age of 45, came of a Swedish family which has contributed many men of distinction to the medical profession. He had already come to the fore as a research worker, and was the creator of the department for experimental histology at the Karolinska Institute in Stockholm. Here he organized and directed biochemical research, devising new and improving old methods of investigation. More than 60 papers of his had been published. One of his most important contributions to research on the subject of the production of heparin by giant cells was published by him in 1937 in conjunction with Jorpes and Wilander. He also spent many years studying the rhythmical functions of the liver. His study of the variations in the fat content of the liver and other organs was published in 1936. Work on experimental endocrinology led him to the discovery of new methods for measuring hormones, and he was also an authority on tissue culture and the growth of experimental tumours.

Dr. WILLIAM JOSIAH LOWE FFRENCH, who had practised in North Lincolnshire for 30 years, died at his home in Marnhull, Dorset, on March 23, aged 84. The son of the Rev. Canon ffrench, of Shinrone, Ireland, he qualified in Dublin in 1890, being second senior medical prizeman at the Royal College of Surgeons in Ireland. After holding resident hospital appointments in England, he went into practice in Barnetby-le-Wold, where he remained until 1925. Dr. ffrench built up an impressive reputation locally, and was an ex-president of the East Yorks and North Lincs Branch of the B.M.A. and chairman of the North Lincoln Division in 1924–5. A county J.P., he took an active part in the work of the Unionist-Conservative Association of the area. In the 1914–18 war he was medical officer at the Brocklesby Hall Auxiliary Hospital and also medical officer to the R.F.C. air station at Elsham. After retiring to Dorset in 1925 he made several voyages to the Far East in troop-ships as medical officer, and at the outbreak of the second world war, at the age of 72, he was medical officer on board a ship going across the Atlantic to Trinidad during the early period of the submarine menace. From 1940 to 1947 he was civilian medical officer to the Military Hospital, Shaftesbury. Dr. ffrench was for 60 years a member of the B.M.A., and was chairman of the North Lincolnshire Division in 1924–5.

G. E. M. writes: I knew William J. Lowe ffrench for 48 years. He was always cheery, full of Irish wit, and ready to help and give his sound advice to everyone. He worked hard and never spared himself to attend his patients at any time of the day or night. He was beloved by them all, and they looked upon him not only as their doctor but their friend and adviser—in fact he was the true example of the "family doctor." He died of pneumonia after influenza, and his loss will be mourned not only by his wife and family but by his patients and many friends.

Dr. WILLIAM DUNCAN SILKWORTH, who gave much help and encouragement to the founders of Alcoholics Anonymous, died in New York on March 22 at the age of 77. He had been medical superintendent for 19 years of the Charles B. Towns Hospital for alcoholic and narcotic addiction.

The Services

NAVAL MEDICAL COMPASSIONATE FUND

A meeting of the subscribers of the Naval Medical Compassionate Fund will be held at the Medical Department of the Navy, Queen Anne's Mansions, St. James's Park, London, S.W., on Friday, April 20, at 2.30 p.m., to elect six directors of the fund.

Medico-Legal

SUCCESSFUL DEFENCE OF INSANITY

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

A defence on the grounds of insanity—schizophrenia—was successfully raised at Winchester Assizes on March 8 at the trial of Ivor Powell, age 18½, for the murder of his grandmother.

Powell's parents died when he was some 6 years old, and after a short time spent in a cottage home run by Bath City Council he lived with various relations. For some six months up to April, 1950, he lived with his maternal grandfather and step-grandmother, of both of whom he was extremely fond. He left them because the work was too much for his grandmother, and went to live with another aunt. On January 24, 1951, his grandfather died of a stroke. Powell was at the funeral with the rest of the family, and though undemonstrative was obviously upset. He spent a long time with his grandmother helping her on that day. At this time he was recovering from an attack of influenza and was off work.

Two days later, on January 30, he went to see his grandmother in the morning. He was with her for about an hour and a half. Then, for no reason other than that she said his grandfather had lived as long as he had because she, and not his family, had been looking after him, Powell beat his grandmother's head in with the poker. Dr. C. R. Gibson, lecturer in forensic medicine at Bristol University, who carried out the necropsy, said in evidence that for a lad of Powell's slight build and poor muscular development to have caused such terrible injuries he must have used "maniacal force." Powell then went home. Nothing unusual in his demeanour was apparently noticed by the family. The body was found two days later, and in the early morning of February 2 Powell was arrested and made a voluntary statement in which he described quite clearly what he had done, showing no worry or remorse and not appearing to appreciate the seriousness of his position.

While he was in prison on remand his whole history was explored, and he was examined by Dr. Thomas Christie, principal medical officer at Holloway Prison, in consultation with the medical officers of Bristol Prison and Winchester Prison. Powell's school reports showed that his conduct was always excellent, but that his intellectual capacity, which was originally full of promise, began to deteriorate at about the age of puberty. His final report said that, while his behaviour was almost too good, his work, though not wholly unsatisfactory, was not what it had promised to be.

His relations all found him of very unemotional temperament, with few friends and no girl friends. Though apparently a competent workman at his job, he himself said his mates at work called him a poor workman. He was quite calm and intelligently interested in his surroundings while in prison on remand, and showed no signs of apprehension. There was no family history of insanity.

Dr. Christie, founding his opinion on this history and his personal observation, gave evidence that Powell was a schizoid type. At the time of Dr. Christie's examination and at the trial he was not certifiable as insane, but Dr. Christie thought it possible that he would become certifiable as a sufferer from schizophrenia. Acute attacks of schizophrenia, which might last only a few minutes, could and often did develop suddenly, with no warning. He could find no definite signs of schizophrenia in Powell at the time of his examination, but thought it probable that he suffered from an acute attack on the morning of January 30, an attack of short duration from which he entirely recovered, reverting to his schizoid state. The savage ferocity of the assault on his grandmother was typical of attacks by schizophrenics.

Dr. Christie then considered schizophrenia in relation to the legal tests of insanity as affecting criminal responsibility —the M'Naghten Rules. Schizophrenia was a "disease of the mind" causing deterioration of the patient's whole personality, leaving him with no control over his emotions and at times no control over his speech and actions. Accordingly it produced a "defect of reason." When suffering from this the patient would know "the nature and quality of his act," but would be quite incapable of knowing "that what he did was wrong." Powell would therefore have known what he was doing when he hit his grandmother on the head with the poker, and would remember all about it afterwards, but would not know until he had recovered from his attack that what he did was wrong.

The jury duly returned the special verdict "Guilty of the act charged but insane at the time of doing the act," and Mr. Justice Byrne ordered Powell to be detained in Broadmoor. So for once doctors, lawyers, and laymen were all in agreement about schizophrenia in relation to criminal responsibility.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

The honorary degree of D.Sc. will be conferred on Sir John Sebastian Bach Stopford, M.D., F.R.C.P., F.R.S., Vice-Chancellor of and Professor of Experimental Neurology in the University of Manchester, on June 7.

The following medical degrees were conferred on March 17:

M.D.—T. D. Kellock, J. M. Willcox.

M.B., B.CHIR.—*P. H. Shorthouse, *Aideen O'Brien.

*By proxy.

UNIVERSITY OF GLASGOW

James William Howie, M.D., Head of the Department of Pathology and Bacteriology at the Rowett Research Institute, Aberdeen, has been appointed to the Gardiner Chair of Bacteriology in the University of Glasgow. Professor Howie was educated at Robert Gordon's College, Aberdeen, and at the University of Aberdeen, where he graduated M.B., Ch.B., with honours, in 1930, proceeding M.D., with honours, in 1937. From 1938 to 1946 he was lecturer in bacteriology in the University of Aberdeen, his lectureship being interrupted by a period of war service in West Africa, where he worked on the problem of yellow fever. In 1946 he was appointed to the Rowett Research Institute and in the same year he became assistant editor of the *Journal of Pathology and Bacteriology*.

UNIVERSITY OF EDINBURGH

The honorary degree of LL.D. will be conferred on July 6 on Benjamin Philp Watson, M.D., F.R.C.S.Ed., F.R.C.O.G., Professor Emeritus of Obstetrics and Gynaecology, Columbia University, New York, and formerly Professor of Midwifery in the University of Edinburgh.

UNIVERSITY OF DUBLIN

SCHOOL OF PHYSIC, TRINITY COLLEGE

The Diploma in Gynaecology and Obstetrics has been awarded to the following successful candidates: F. A. Akerele, L. R. Ashley, W. A. G. Bishai, R. Brown, D. C. J. Carter, A. J. R. Clarke, M. Debnath, J. P. M. Droulers, W. H. D. Fairbank, S. W. Ghali, S. Haroon, S. el-D. H. Issa, S. Lourdenadin, P. C. McAuliffe, M. B. Millerick, G. E. Peters, A. Press, A. Schutz, A. R. Sen, S. Thurairetnam.

The following candidates have been approved at the examination indicated:

B.A.O.—[1]W. Gault, [1]Patricia M. Leeson, [1]Ethel A. L. Blake, [2]N. Boland, [2]S. P. Fitz-Simon Cotton, [2]Phyllis E. McCready, [2]J. A. K. Meldrum, [2]J. G. Goodbody, [2]G. T. Nelson, [2]R. J. Weir, [2]E. Taylor, [2]R. D. Thornes, [2]Patricia [2]M. Woolf, [2]T. Asuni, [2]E. D. Cooke, [2]Matilda M. Dickey, [2]T. D. Kimmet, [2]G. J. Malseed, [2]J. R. Cole, [2]Joan M. Falkiner, [2]J. R. MacN. Houston, [2]R. King, [2]Elizabeth M. Senior, Margaret M. Bell, S. D. Coleman, J. O. Farinde, Edith P. Pringle, Frances J. Baker, Marian F. Cianchi, Doreen E. Mallagh, L. Tarlo, A. S. Dewar, J. Morrow, H. G. Smith, Mary D. Brosnan, H. M. O. Brown, Sheila E. Weir, T. E. W. Winckworth, Ethel P. Cole, Aileen F. Smith, Ruth M. Ransom, Audrey M. M. Fair, W. A. Beatty, K. W. M. Harbord, E. Ward, Iris E. Byers, Hazel Morris, L. M. Dillon, I. A. Eppel, Patricia R. Hunter, R. F. Hutchings, B. W. Withrington, J. Hunter, S. S. Faloon, H. R. B. Jack.

[1]With first-class honours. [2]With second-class honours.

UNIVERSITY OF LONDON

The following have been appointed, or nominated for appointment or reappointment, as representatives of the University on the governing bodies indicated in parentheses: Dr. Vernon F. Hall (King's College Hospital); Dr. E. Pochin (Royal Cancer Hospital); Major-General P. H. Mitchiner (Territorial and Auxiliary Forces Association of the County of the City of London).

The following have been appointed representatives of the University on the committees of management of the following institutes of the British Postgraduate Medical Federation: *Cardiology*, Sir James Paterson Ross; *Dental Surgery*, Professor W. E. Herbert; *Dermatology*, Sir Archibald Gray; *Diseases of the Chest*, Mr. J. B. Hunter; *Laryngology and Otology*, Mr. V. E. Negus; *Obstetrics and Gynaecology*, Professor W. C. W. Nixon; *Orthopaedics*, Professor J. D. Boyd; *Psychiatry*, Professor F. R. Winton; *Urology*, Mr. P. H. Mitchiner.

The following have been recognized as teachers of the University in the subjects indicated in parentheses: *Institute of Ophthalmology*, Dr. S. Behrman (Medicine), Mr. J. D. M. Cardell, Mr. R. C. Davenport, Mr. C. L. Gimblett, Mr. A. G. Leigh, Mr. P. McG. Moffat, Mr. A. S. Philps, Mr. F. T. Ridley, and Mr. E. Wolff (Ophthalmology); *Institute of Psychiatry*, Dr. C. P. Blacker (Mental Diseases); *Institute of Laryngology and Otology*, Mr. C. Gill-Carey and Mr. G. H. Howells (Oto-rhino-laryngology); *Royal Free Hospital School of Medicine*, Dr. W. Gunn (Medicine); *Guy's Hospital Medical School*, Dr. J. N. Hunt (Physiology); *Westminster Medical School*, Mr. R. W. Raven (Surgery); *St. Thomas's Hospital Medical School*, Dr. W. W. Sargant (Mental Diseases); *Royal Dental Hospital of London School of Dental Surgery*, Dr. O. L. C. Sibley (Anaesthetics); *St. Mary's Hospital Medical School*, Dr. R. R. Wilson (Pathology). Dr. M. W. Lloyd-Owen has been granted probationary recognition as a teacher of anaesthetics at St. Mary's Hospital Medical School for two years from December, 1950.

The Board of Intermediate Medical Studies and the Board of Preliminary Medical Studies were discharged on March 31. A Board of Preclinical Studies was established on April 1, belonging to the Faculties of Medicine and Science. The personnel of the board was printed in the *University of London Gazette* of February 24 (p. 241). From April 1 the constitution of the Board of the Faculty of Medicine was amended by the addition of three representatives of the Board of Preclinical Studies, and of the Board of the Faculty of Science by the addition of two representatives. One representative will be nominated by the board to serve on the Board of Advanced Medical Studies.

Regulations have been approved for a preclinical examination being instituted for internal students entering upon medical courses in and after October, 1953. The present regulations for the first and second examinations for medical degrees will remain in force until further orders for those schools which are unable to provide the necessary courses of study under the regulations for the preclinical examination. Part 1 of the preclinical examination for internal students will be held for the first time in July, 1954.

Internal students who apply for entry to courses in medicine in and after October, 1953, will be required (*a*) to satisfy the minimum University entrance requirements in one of the ways provided by the regulations; (*b*) to satisfy the preliminary requirement for admission to the Faculty of Medicine by passing in chemistry and physics at least at ordinary level at an examination for the general certificate of education awarded by one of the approved University examining bodies.

The examination for Part II of the Academic Postgraduate Diploma in Psychological Medicine for 1951 will begin on October 22, and the closing date for the receipt of entries is October 1.

The Sanderson-Wells Prize (Senior), of the value of £20, for the best essay on "The Dietary Treatment of Hypertension," and the Sanderson-Wells Prize (Junior), of the value of £10, for the best essay on "The Comparative Merits of Animal and Vegetable Foods for Human Nutrition," are offered in 1952. Entries for the senior prize must be submitted by May 31, 1952, and for the junior prize by April 30, 1952, to the Academic Registrar, Senate House, London, W.C.1, from whom full particulars of the two prizes may be obtained.

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles for the week ending March 17 (No. 11).

Figures of notified *cases* are for: (*a*) England and Wales (London included). (*b*) London (administrative county). (*c*) Scotland. (*d*) Northern Ireland. (*e*) Eire. Figures of *births and deaths* and of *deaths* recorded under each disease are for: (*a*) The 126 great towns in England and Wales (London included). (*b*) London (administrative county). (*c*) The 16 principal towns in Scotland. (*d*) The 10 principal towns in Northern Ireland. (*e*) The 13 principal towns in Eire. A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

The table is based on information supplied by the Registrars-General of England and Wales, Scotland, Northern Ireland, and Eire, the Ministry of Health and Local Government of Northern Ireland, and the Department of Health of Eire.

Disease	1951 Week Ending March 17					1950 Corresponding Week					1942–50 England & Wales Corresponding Week		
	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)	Highest	Median	Lowest
Diphtheria	50	2	29	—	—	62	5	19	3	1	892	475	62
Deaths	—	—	—	—	—	2	—	—	—	—			
Dysentery	1,672	194	213	19	1	398	19	72	1	1	428	170	35
Deaths		1		—					—				
Encephalitis, acute	2	1	—	—		5	—	—	—	—	5	2	—
Deaths		—			—		—						
Erysipelas			38	1	2			43	5	9			
Food-poisoning	88	9		1		40	1		—				
Infective enteritis or diarrhoea under 2 years				16	23					11			
Deaths	16		5	2	—	25		3	—	3			
Measles*	31,837	3,136	482	94	90	5,577	54	277	364	147	25,266	10,034	1,605
Deaths		—	—	—	—			—	1	1			
Meningococcal infection	38	1	12	1	5	37	2	16	2	4	281	81	37
Deaths		—	1				1	—					
Ophthalmia neonatorum	41	3	16	1	1	39	2	10	1		103	78	39
Pneumonia, influenzal	1,106	64	16	22	12	1,078	46	16	14	10	1,573	1,078	876
Deaths (from influenza)†	88	15	5	—	10	167	24	6	2	5			
Pneumonia, primary			241					227					
Deaths	326	57		12	15	343	72		9	12			
Poliomyelitis, acute:													
Paralytic	18	2	1	—	2	27	5	—	2	3	25	5	1
Non-paralytic	—	—											
Deaths§	—	—			—	4	—			1			
Puerperal fever			4				—	6					
Puerperal pyrexia‖	80	13	8	1		100	9	6	2		175	148	100
Scarlet fever	1,007	54	173	46	48	1,837	109	171	115	78	2,395	1,621	1,143
Deaths		—	—	—	—			—	—	—			
Smallpox	—	—	—	—		—	—	—	—	—			
Deaths				—					—				
(1) Tuberculosis, respiratory			182	31				162	47				
(2) Tuberculosis, non-respiratory			35	6				30	4				
(1) Deaths	227	34	24	6	11	203	31	32	10	13			
(2) Deaths		5	5	1	—		—	3	1	4			
Typhoid fever	1	—	1	—	1	5	2	1	—	—			
Deaths¶	—	—	—	—		—	—	—	—				
Paratyphoid fever	5	—	—	—	2 (B)	3	—	—	—		21	11	5
Whooping-cough	5,516	402	852	34	91	2,231	70	402	52	46	3,314	2,026	1,527
Deaths	10	3	3	1	—	10	—	—	—	—			
Deaths (0–1 year)	299	32	54	10	16	267	33	32	9	18	630	411	267
Deaths (excluding stillbirths)	6,579	1,042	737	150	211	5,937	935	675	142	195	7,456	5,798	4,941
Annual death rate (per 1,000 persons living)			14·9					13·6					
Live births	7,644	1,188	949	235	296	7,921	1,312	808	253	318	10,167	7,706	6,425
Annual rate per 1,000 persons living			19·2					16·2					
Stillbirths	172	25	23			191	29	25			317	221	191
Rate per 1,000 total births (including stillborn)			24					30					

* Measles not notifiable in Scotland and returns are approximate. † Includes primary form for England and Wales, London, and N. Ireland. § The number of deaths from poliomyelitis and polio-encephalitis for England and Wales, and London (administrative county), are combined. ‖ Includes puerperal fever for England and Wales and for Eire. ¶ Deaths from paratyphoid fever are combined with those from typhoid fever.

Vital Statistics

Poliomyelitis

In the week ending March 24 notifications of poliomyelitis were: paralytic, 10 (18); non-paralytic, 3 (0); total, 13 (18). The figures for the previous week are in parentheses. Total uncorrected notifications for the first 12 weeks of the following years have been as follows: 1947, 118; 1948, 399; 1949, 233; 1950, 492; 1951, 314.

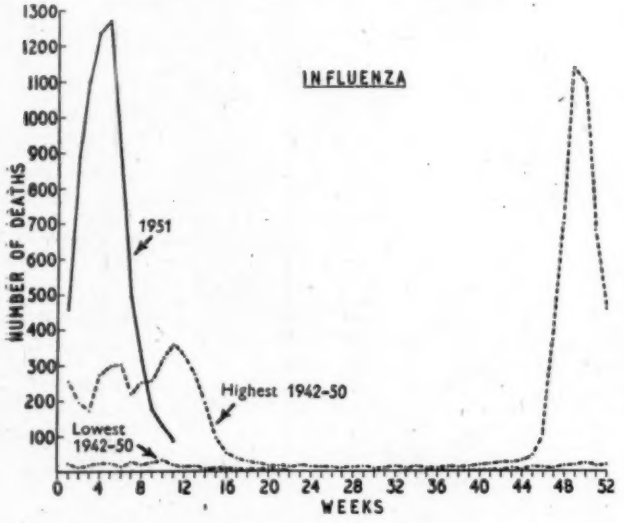
Industrial Accidents and Diseases

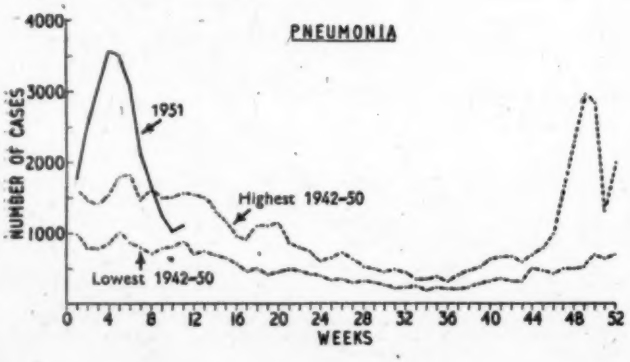
The number of workpeople (other than seamen) in the United Kingdom whose deaths from accidents in the course of their employment were reported in February was 149, compared with 141 in the previous month, and 131 (revised figure) in February, 1950 (*Ministry of Labour Gazette*, March, 1951). Of these fatal accidents 53 were underground in coal mines.

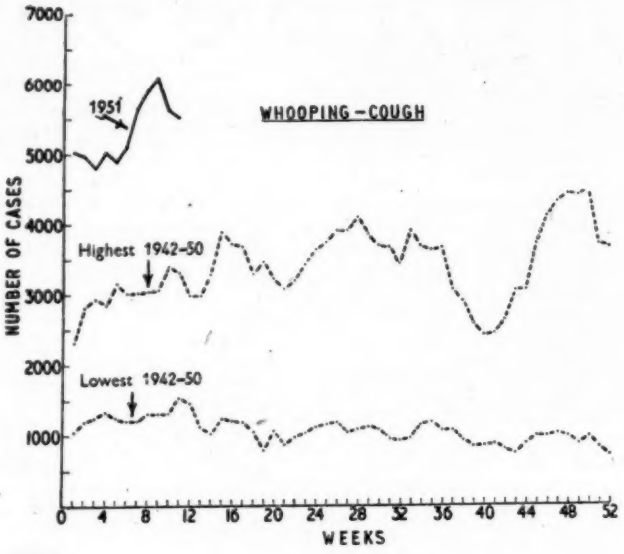
There were 28 cases of industrial diseases reported during February. These included: lead poisoning, 8; anthrax, 1 (in the wool industry); epitheliomatous ulceration, 4; and chrome ulceration, 28.

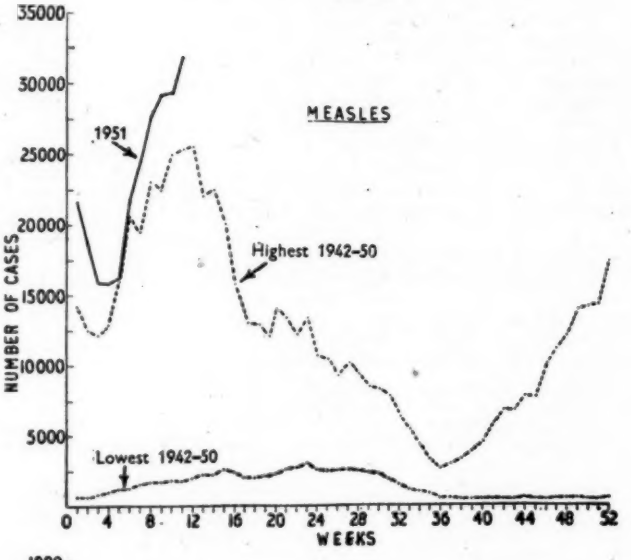
Graphs of Infectious Diseases

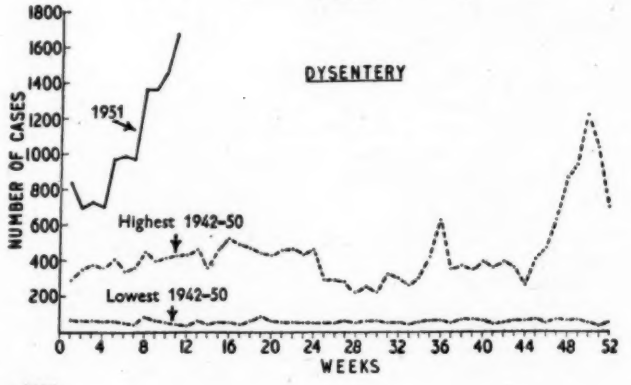
The graphs below show the uncorrected numbers of cases (deaths from influenza) of certain diseases notified weekly in England and Wales. Highest and lowest figures reported during the nine years 1942–50 are shown thus - - - - - -, the figures for 1951 thus ———. Except for the curves showing notifications in 1951, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.

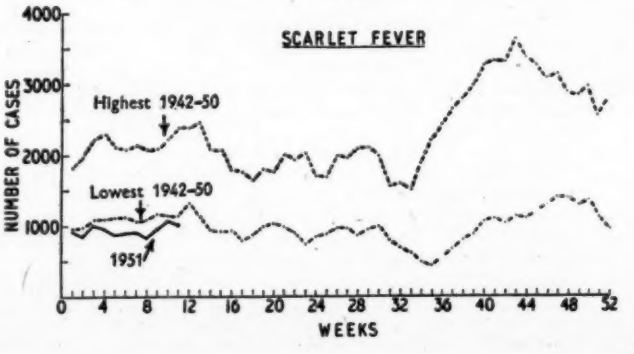












Infectious Diseases

During the week ending March 17 the chief variations in the trends of infectious diseases in England and Wales were increases in the number of notifications of measles 2,770 and dysentery 223, and decreases for whooping-cough 121 and scarlet fever 49.

The number of notifications of measles in England and Wales (31,837) was 2,683 above the record number of a fortnight earlier. The largest increases were Southampton 470, Lancashire 387, Yorkshire West Riding 366, Warwickshire 267, while the only decrease of any size was that of London 365. A further rise in the number of notifications of measles occurred in Scotland and the incidence is twice as high as a month ago.

Only a few counties showed any variations in the trend of whooping-cough. The largest were decreases in Staffordshire 96, Kent 87, and a rise of 54 in Hertfordshire.

No change of note occurred in the local returns of diphtheria in England and Wales. In Scotland there were 11 more notifications of diphtheria, the largest return of diphtheria for over a year; the chief centres of infection were the cities of Aberdeen 13 and Glasgow 10.

No change of any size occurred in the returns of scarlet fever. A rise of 5 occurred in the notifications of acute poliomyelitis; the only areas with multiple notifications were Warwickshire, Birmingham C.B., 3, and Middlesex, Willesden M.B., 2. Of the 38 cases of meningococcal infections, 10 were notified in Lancashire.

The notifications of dysentery rose to a new high level. New outbreaks were reported during the week from Southampton, Droxford R.D., 42; Hertfordshire, Hitchin R.D., 38; Suffolk, Newmarket U.D., 23. The largest returns were Lancashire 236, London 194, Middlesex 194, Essex 125, and Suffolk 101.

Annual Report for Scotland

The *Annual Report* of the Registrar-General for Scotland for 1948 shows that the birth rate was 19.4 per 1,000 of the population; this rate was 2.6 below the rate for 1947 and 0.9 below the rate for 1946, but with these exceptions it was the largest birth rate since 1930. The infant mortality rate was 44.7 per 1,000 live births and was the lowest rate ever recorded in Scotland. Maternal deaths numbered 161, the lowest number ever recorded. Stillbirths were equivalent to a rate of 29 per 1,000 total births and were the lowest recorded since stillbirths were first registered in 1939, when the rate was 42.

The general death rate for the year was 11.8 per 1,000 and was the lowest ever recorded in Scotland. The death rate from respiratory tuberculosis was 66 per 100,000, the same as in 1947, while the death rate from other forms of tuberculosis showed a marked decrease with a rate of 9 per 100,000 compared with 14 in 1947. Non-pulmonary tuberculosis has steadily declined since 1943, when the rate was 21. The death rate from the principal epidemic diseases was 7 per 100,000, being exceptionally low, mainly because of a reduction in the numbers of deaths from influenza and whooping-cough. Of the 364 deaths in this group, 140 were attributed to influenza, 74 to measles, 63 to whooping-cough, 47 to cerebrospinal fever, and 31 to diphtheria.

The standardized death rate per 1,000 for Scotland was 1.6 above the rate for England and Wales. The death rate for tuberculosis of the respiratory system was 243 per million, and for other forms 23, above the rate for England and Wales. The birth rate per 1,000 of the population in Scotland was 1.5 above the rate for England and Wales.

Week Ending March 24

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 919, whooping-cough 4,079, diphtheria 50, measles 27,813, acute pneumonia 936, acute poliomyelitis 13, dysentery 1,256, paratyphoid fever 10, typhoid fever 7. Deaths from influenza in the great towns numbered 67.

Medical News

The Census in Hospitals

The first census since 1931, which is being taken throughout the United Kingdom on Sunday, April 8, involves the chief resident or some other responsible member of the staff of all hospitals with more than 100 patients and staff in the labour of compiling a return for the whole institution, except where an individual prefers to complete a separate confidential return. In very small hospitals, however, the local official enumerator will do the work. The Ministry of Health has issued instructions to all hospitals accordingly.

Medical Peace Movement

On March 16 a meeting of 130 doctors was held at 45, Russell Square, London, W.C.1, to discuss "The Prospect of War." The meeting arose out of the correspondence on this subject which had appeared in the *Lancet*. Dr. Horace Joules was in the chair. Dr. Duncan Leys opened the discussion by saying that the meeting had been called to consider whether doctors had a specific duty in the prevention of war and, if they had, what it was they could do to implement that duty. Pasteur, at the opening ceremony of the Pasteur Institute, had said, "Two opposing laws seem to me now in conflict. The one, a law of blood and death, opening out each day new modes of destruction, forces nations to be always ready for battle; the other, a law of peace, work, and health, whose only aim is to deliver man from the calamities which beset him. The one seeks violent conquests, the other the relief of mankind." The first law was now being chosen. Doctors had a twofold responsibility, as ordinary members of society and because of their privileges and duties as healers. They had been given a general and scientific training which imposed an obligation to think and act rationally; their daily work gave them an unrivalled opportunity to understand the motives which lay behind men's actions; they were bound by an ethic to preserve life and to take no action which would injure it; in a conflict of opposing ideologies their overriding duty was to their profession and their first loyalty to humanity. Dr. Leys quoted Sir Ernest Rock-Carling as saying, in reference to war, that medical men were better able to appreciate the risks and should know what could be done to avoid them or to mitigate their results. War was not an act of God. It had causes which were traceable and preventable, but, like many other diseases, it would spread in the absence of a positive will to abolish it. Fifteen doctors took part in the discussion, and it was finally resolved (on the proposal of Professor Penrose) to set up a permanent committee open to all doctors interested in the preservation of peace. An executive committee was elected and was asked to prepare a statement of policy in the light of the discussion.

Economy in Surgical Appliances

The Minister of Health has asked hospital medical staff to economize as far as reasonably possible in prescribing appliances such as surgical corsets, surgical boots, and wigs under the National Health Service. Experience has shown that many people are asking their doctors for appliances which are really articles of clothing—corsets, for instance—while others complain when asked to provide boots for adaptation, and yet others demand an appliance which other suitable treatment would render unnecessary.

Human Milk in Birmingham

The City of Birmingham has established a Human Milk Bureau at 25, Francis Road, Birmingham, 16 (telephone EDGbaston 2321). A pasteurizing plant has been installed, and the milk can be supplied to hospitals and to domiciliary cases. Priority is given to premature and acutely ill infants.

No charge is made for breast milk supplied to domiciliary cases in the City. At the moment the charge to all hospitals and to domiciliary cases outside this area is 7d. per ounce, plus transport costs. It is not possible for the Bureau to deliver the milk either inside or outside the City, but it can be sent to the nearest railway station. Application for supplies of breast milk should be made to the above address between the hours of 9 a.m. and 5 p.m. on weekdays, 12 noon on Saturdays, and until 10.30 a.m. on Sundays.

Uncertificated Almoners

The Institute of Almoners has decided to open a *Supplementary Register* for certain of those almoners at present employed in the National Health Service and not holding the Institute's own certificate of qualification. The register will be open until December 31, and admission will be according to experience and qualifications. Those applying must be over 30 years of age, engaged in medico-social work in hospital, and known as almoner both at the time of application and continuously for three years prior to July 5, 1948.

Special Rations for Patients

The Minister of Food announces, on the recommendation of the Food Rationing (Special Diets) Advisory Committee of the Medical Research Council, that patients suffering from nephritis with gross oedema and albuminuria or from hypoproteinaemia will, until further notice, be allowed six extra meat rations a week instead of four. Children under 5 years who suffer from either of these diseases will now be allowed the same amount of meat as adult patients. No increases in meat ration have been recommended for patients suffering from diabetes mellitus, hepatitis (acute infective or chronic), or steatorrhoea.

Insurance Against Infection

The *Daily Telegraph* reported on March 13 that Lloyd's now offer insurance against poliomyelitis, smallpox, typhoid, and paratyphoid on a family basis for £2 a year. This premium covers husband and wife and all children less than 18 years old, and provides for payment of £10 a week to any affected member for a maximum of 100 weeks, or a maximum benefit of £1,000 in the event of at least 50% disablement.

In Brief

Sponsored by the British Council, Professor J. M. McMichael, professor of internal medicine in the University of London Postgraduate Medical School, and Professor C. Lovatt Evans, emeritus professor of physiology in University College, London, are visiting Madrid and Barcelona between March 28 and April 20 to advise on medical education in Spain.

COMING EVENTS

Vellore Christian Medical College and Hospital

A concert in aid of this hospital in South India is being given in the Albert Hall at 7.30 p.m. on Monday, April 16, by the London Philharmonic Orchestra, conducted by Sir Adrian Boult, with Miss Eileen Joyce as the pianist. Tickets may be obtained from the "Friends of Vellore," Annandale, North End Road, N.W.11, or from the usual agencies.

Wessex Rahere Club

The club is open to all old Bart's men in the West Country, and a dinner is being held at the Royal Clarence Hotel, Exeter, on Saturday, April 21, at 7 for 7.30 p.m., with Professor L. P. Garrod as guest of honour. Further information may be obtained from Mr. A. Daunt Bateman, 3, The Circus, Bath.

Empire Rheumatism Council

A spring week-end course, arranged by the Empire Rheumatism Council, will be held at the Arthur Stanley Institute, Middlesex Hospital, Peto Place, Marylebone Road, London, N.W., on Friday and Saturday, May 4 and 5. The programme is as follows: May 4, 4.30 p.m., Dr. W. S. C. Copeman, "Cortisone and A.C.T.H. in the Rheumatic Diseases"; 5.30 p.m., Dr. F. Dudley Hart, "Gout." May 5, 10 a.m., Dr. A. C. Boyle, "Physical Methods of Treatment in the Rheumatic Diseases, with Demonstrations of Physio- and Hydrotherapy"; 11.30 a.m., Dr. Hugh Burt, "Rheumatoid Arthritis"; 2 p.m., Dr. H. F. West, "Ankylosing Spondylitis"; 3 p.m., Dr. Douglas Collins, "Pathology of the Rheumatic Diseases"; 4.30 p.m., Mr. W. D. Coltart, "Surgical Aspects of Osteoarthritis." The fee for the course (limited to 60) is £2 2s., and remittances must reach the general secretary of the council, Tavistock House (North), Tavistock Square, London, W.C.1, at least one week before the course begins.

American Association of the History of Medicine

The annual meeting will be held at the Institute of the History of Medicine of the Johns Hopkins University from May 3, at 8 p.m., until noon, May 5. Visitors will be welcome at all sessions of the association's meeting, and further information may be obtained from the secretary, Dr. Iago Galdston, 2, East 103 Street, New York 29, N.Y.

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Application should be made first to the institution concerned.

Friday

INSTITUTE OF PSYCHIATRY, Maudsley Hospital, Denmark Hill, London, S.E.—April 6, 2 p.m., *"Recent Swedish Studies in Mental Health: Sjöbring's Concept of Personality Variations,"* by Professor Erik Essen-Möller (University of Lund). (See also April 9.)

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, London, W.C.—April 6, 5 p.m., *"The Diagnosis of Stone in the Urinary Tract,"* Urology Lecture by Mr. F. J. F. Barrington.

Monday

INSTITUTE OF OPHTHALMOLOGY, Judd Street, London, W.C.—April 9, 5.30 p.m., *"The Accommodation Reflex and its Stimulus,"* by Mr. E. F. Fincham.

INSTITUTE OF PSYCHIATRY, Maudsley Hospital, Denmark Hill, London, S.E.—April 9, 3 p.m., *"Recent Swedish Studies in Mental Health: A Census of Physical and Mental Health,"* by Professor Erik Essen-Möller (University of Lund). (See also April 6.)

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, Cavendish Square, W.—April 9, 8.30 p.m., discussion: *"Oedema of the Legs,"* to be introduced by Dr. Ralph Kauntze and Mr. Rainsford Mowlem.

ROYAL EYE HOSPITAL, St. George's Circus, London, S.E.—April 9, 5 p.m., *"Medical Ophthalmology,"* by Professor Arnold Sorsby.

Tuesday

CHADWICK TRUST.—At University College, Southampton, April 10, 4.30 p.m., *"Public Health and Social Welfare in the Evolution of Medicine,"* Chadwick Public Lecture by Dr. Charles Seeley.

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W.—April 10, 5 p.m., *"Physical Exercise: Its Clinical Associations,"* Lumleian Lecture by Sir Adolphe Abrahams. (See also April 12.)

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, London, W.C.—April 10, 3.45 p.m., *"Meckel's Diverticulum and its Complications,"* Erasmus Wilson Demonstration by Mr. P. H. Mitchiner.

ROYAL EYE HOSPITAL, St. George's Circus, London, S.E.—April 10, 5 p.m., *"Cycloplegia, Hypermetropia: Retinoscopy,"* by Dr. T. H. Whittington.

ST. ANDREWS UNIVERSITY.—At Lecture Theatre, Materia Medica Department, Medical School, Small's Wynd, Dundee, April 10, 5 p.m., *"The Biochemical Basis of Uterine Contractility,"* by Dr. S. R. M. Reynolds.

SOCIETY OF PUBLIC ANALYSTS: PHYSICAL METHODS GROUP.—At Iron and Steel Institute, 4, Grosvenor Gardens, London, S.W., April 10, 6.30 p.m., 31st ordinary meeting organized by the Polarographic Discussion Panel. Papers will be read.

Wednesday

GLASGOW UNIVERSITY: DEPARTMENT OF OPHTHALMOLOGY.—April 11, 8 p.m., *"The Nature of Exophthalmos,"* by Dr. K. C. Wybar.

INSTITUTE OF OPHTHALMOLOGY, Judd Street, London, W.C.—April 11, 5.30 p.m., *"The Spectral Sensitivity Curve,"* by Dr. L. C. Thomson.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, London, W.—April 11, 3.30 p.m., *"Public Health and International Broadcasting,"* by Mr. B. V. de G. Walden, Ph.D.

SOCIETY OF CHEMICAL INDUSTRY: FOOD GROUP.—At Chemical Society, Burlington House, London, W., April 11, 6.30 p.m., 20th annual general meeting. *"The Man of Taste,"* by Mr. A. L. Bacharach, M.A., F.R.I.C.

Thursday

LONDON JEWISH HOSPITAL MEDICAL SOCIETY.—At London Jewish Hospital, Stepney Green, London, E., April 12, 3 p.m., clinical meeting.

ROYAL ARMY MEDICAL COLLEGE, Millbank, London, S.W.—April 12, 5 p.m., *"The Significance of Anaemia,"* by Sir Lionel Whitby.

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W.—April 12, 5 p.m., *"Physical Exercise: Its Clinical Associations,"* Lumleian Lecture by Sir Adolphe Abrahams. (See also April 10.)

●ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, London, W.C.—April 12, 5 p.m., *"Acute Pancreatitis,"* by Professor Digby Chamberlain; 6.15 p.m., *"Surgery of Hypertension,"* by Mr. A. Dickson Wright.

ST. ANDREWS UNIVERSITY.—At Lecture Theatre, Materia Medica Department, Medical School, Small's Wynd, Dundee, April 12, 5 p.m., *"The Embolism of Normal and of Malignant Tumour Cells,"* by Professor J. S. Young.

TORQUAY AND DISTRICT MEDICAL SOCIETY.—At Newton Abbot Hospital, April 12, 4.30 p.m., clinical meeting.

Friday

ALFRED ADLER MEDICAL SOCIETY.—At 11, Chandos Street, London, W., April 13, 8 p.m., *"Asthma in Childhood,"* by Dr. Margaret Lowenfeld. Discussion to be opened by Drs. E. B. Strauss and M. G. Good.

INSTITUTE OF OPHTHALMOLOGY, Judd Street, London, W.C.—April 13, 5.30 p.m., *"Viruses in Ocular Diseases,"* by Dr. C. H. Smith.

LIVERPOOL PSYCHIATRIC CLUB.—At 36, Rodney Street, Liverpool, April 13, 8 p.m., *"The Development of the Psychiatric Services,"* by Dr. J. E. Howie.

MANCHESTER REGION REGISTRARS' GROUP.—At Clinical Lecture Theatre, Royal Infirmary, Manchester, April 13, 5.30 p.m., annual general meeting.

MEDICAL SUPERINTENDENTS' SOCIETY.—April 13 (1) at Liverpool Medical Institution, Mount Pleasant, Liverpool, 10 a.m., annual general meeting; (2) at Exchange Hotel, Liverpool, 7 p.m., annual dinner.

●ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, London, W.C.—April 13, 5 p.m., *"Tumours of the Innominate Bone,"* by Sir Gordon Gordon-Taylor; 6.15 p.m., *"Fractures of the Shaft of the Tibia,"* by Mr. F. W. Holdsworth.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.—Visit to Chelsea Physic Gardens, April 13, 5.45 p.m., demonstration by Mr. W. G. Mackenzie and talk by Dr. W. S. C. Copeman; 6.30 p.m., sherry party (tickets 5s.).

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Calvert-Smith.—On March 9, 1951, at Launceston, Tasmania, to Dr. Daphne Calvert-Smith (formerly Bousfield), wife of John E. Calvert-Smith, a sister for Paul.

Clark.—On March 21, 1951, at Farnborough Hospital, Kent, to Mary Rose, wife of Dr. David H. Clark, 8, Winchester Road, Bromley, a daughter—Rosalin Mary.

Harris.—On March 21, 1951, in London, to the wife of Dr. Nigel H. Harris, a son.

Jefferson.—On March 22, 1951, at St. Mary's Hospital, Manchester, to Eirlys (formerly Hughes), wife of Antony Jefferson, F.R.C.S., a sister for Ann—Jane.

MacLeod.—On March 27, 1951, at Nuffield House, Guy's Hospital, to Joan (formerly Lewis), wife of Dr. Ian S. MacLeod, of Forest Hill, London, S.E., a daughter—Fiona.

Shaw.—On March 6, 1951, at Chiswick Hospital, to Jean, wife of Richard E. Shaw, Ch.M., F.R.C.S., a daughter—Deborah.

MARRIAGES

Wischusen—Morphy.—On March 10, 1951, at Melbourne, Australia, Peter James Wischusen to Sheila Morphy, M.B., Ch.B., of London.

DEATHS

Albers.—On March 24, 1951, at Capetown, South Africa, Alfred Gustave August Albers, B.M., F.R.C.S.

Birch.—On March 21, 1951, at 78, London Road, Guildford, William Somerset Birch, M.C., M.R.C.S., L.R.C.P., aged 62.

Bridges.—On March 29, 1951, at Acacia Cottage, Appleford, Berks, Robert Francis Bridges, M.B., B.Ch., Lieutenant-Colonel, R.A.M.C., retired, aged 67.

Any Questions?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

Nylon Smalls

Q.—*Nylon under-garments have considerable advantages for those whose work entails much travelling. Are they healthy to wear in tropical climates or in climates with a high humidity?*

A.—At high temperatures, comfort depends to a very large extent on the evaporation of perspiration, since the loss of body-heat by convection or radiation is restricted. It is essential, therefore, that clothing should limit the removal of perspiration as little as possible and should assist in its evaporation. Perspiration which simply rolls off the body and is not evaporated at the skin surface or in the clothing does nothing to maintain comfort. When also the relative humidity of the atmosphere is high the rate of evaporation of respiration will be slowed down and it will be even more difficult to keep comfortable.

Experiments which have been carried out at the Shirley Institute, Manchester, show that an absorbent fabric produces only a slight change in the rate of evaporation of water from a surface, and that if the fabric is of sufficiently open structure the rate may be even greater than from the uncovered surface. A fabric that can retain a large amount of liquid perspiration within its structure is obviously more desirable than one capable of retaining only a little, for, after the saturation stage has been reached, additional liquid will simply drain away. Hence, for conditions under which the body produces liquid perspiration, an absorbent material of fairly open structure is desirable for next-to-the-skin garments.

Nylon fabrics may contain sizing material applied during their manufacture, and this will tend to make the material non-absorbent or even water-repellent. Moreover, when such substance has not been added, or after it has been removed by a scouring process, nylon used for clothing absorbs water less readily than some other fibres such as scoured wool or cotton. The ability of a fabric to retain water within its interstices is influenced by its structure, but for corresponding structures a nylon fabric as used in clothing will retain less water than, say, cotton or wool. A recent article in *Textile World* (1950, **100**, 118) describes a new process called "nylonizing" for reducing the water-repellency of nylon fabrics, but we have had no experience of this process and cannot, therefore, comment upon its usefulness.

In addition to the liquid perspiration it is also necessary to dissipate insensible perspiration which is continuously secreted by the body even when at rest. In general, the resistance of a textile fabric to the diffusion of water vapour through it is governed by three factors—namely, the thickness of the fabric, the kind of fibre used in its construction, and the closeness of its weave. The thicker the fabric of any given material, the greater is its water-vapour resistance. The diffusion of water vapour through a fabric occurs not only through the interstices but also to an important extent through or along the fibres themselves. In very close fabrics the latter mechanism has considerable importance and may in fact become predominant. Textile fibres differ in the resistance they offer to the diffusion of water vapour through or along them, and this effect is related to how hygroscopic the fibres are—the resistance of absorbent fibres like cotton and wool is low compared with that of nylon. Hence a closely woven nylon fabric would offer rather greater resistance to the passage of water vapour through it than a closely woven cotton or wool fabric of the same thickness. However, the loose structure of the fabrics usually used for

underclothing diminishes the difference in water-vapour resistance due to the nature of the fibres, and in practice evidence of physiological strain due to nylon underwear does not seem to have been reported.

Producer Gas and Blast-Furnace Gas

Q.—*Why is producer gas relatively harmless, while blast furnace gas is so lethal? Both contain 20–25% carbon monoxide.*

A.—The most likely explanation of the different effects of exposure to producer gas and blast furnace gas is that producer gas has a most unpleasant odour. Workers are immediately aware of its presence in the atmosphere in very low concentration. Blast furnace gas is odourless, and hence exposure to dangerous concentrations for prolonged periods may occur. Serious or fatal carbon monoxide poisoning may be the first indication of the presence of blast furnace gas in the working atmosphere.

Fainting and Epilepsy

Q.—*What relationship have faints in church, as seen in schoolboys, to the later development of epilepsy?*

A.—Faints of the type mentioned are clinically distinct from epilepsy, being due to cerebral anoxia from fall of blood pressure or bradycardia. If cerebral anoxia, however, is sufficiently prolonged, convulsive movements may occur. Frequent fainting in adolescence is occasionally followed by the development of epilepsy. The connexion is obscure. It has been suggested that in such patients consciousness is more easily lost, whether from cerebral anoxia or minor epileptic discharge, than in normal persons.

Chlorophyll as a Deodorant

Q.—*Is chlorophyll a safe and efficient deodorant? Apparently it is used in America, both internally and externally, in conditions such as halitosis and offensive suppurating wounds.*

A.—There have been numerous reports from both America and the Continent of the use of preparations containing chlorophyll in the treatment of ulcers, wounds, and similar suppurating injuries. Claims that chlorophyll will accelerate wound healing are of doubtful significance, but the fact that they have been made indicates that at least it does not injure tissues. Solutions have also been applied to the eye. All reports agree about the value of chlorophyll in reducing or suppressing the offensive odour from suppurating wounds. The preparations have no bactericidal activity, and the mode of action of chlorophyll remains obscure. Assuming that the preparation containing the chlorophyll includes no objectionable ingredients as solvents or impurities, it is difficult to believe that a substance that is consumed in such vast quantities by so many different species has any harmful properties. For further information reference may be made to the Report to Council of Pharmacy and Chemistry of the American Medical Association (*J. Amer. med. Ass.*, 1949, **140**, 1336), and to reports in the *American Journal of Surgery* (1943, **62**, 293; 1947, **73**, 37).

How to Train a Colostomy

Q.—*Can you advise me on the training of a sigmoid colostomy? I have had one now for five months, and in spite of all my efforts it continues to be a darned nuisance. For a few days it will behave in a regular manner, producing a firm stool at 9 a.m., and then for no apparent reason, or perhaps because I have eaten something with an onion in it, or because I have done some heavy work like lifting a few bags of hen food (1 cwt. each), it pours out a considerable amount of material of the consistency of a loose rice pudding. At other times it will do nothing for a week, and then suddenly decide to make a filthy mess.*

A.—The successful control of a colostomy of necessity demands a good deal of care and vigilance on the part of the patient. No one with a colostomy can ignore the individual response of his bowel to certain articles of diet, nor can he be entirely carefree in his general activities. It has to be realized that not only has he no good muscular control over the orifice but that there is no real reservoir for faecal accumulation, so that if softish faecal material reaches the opening it is bound to be discharged. The human bowel is very idiosyncratic in its response to various foods, and each individual has to find out by experience what foods he can safely take and what to avoid. There are, however, some types of food which practically all patients find it necessary to cut out of their diet; the leafy green vegetables, for instance, usually cause trouble, not only because of their stimulant action on the large bowel, but also on account of the associated odour. The onions mentioned in the query are well recognized to be thus troublesome to many patients.

Those who are naturally constipated come off best, for the secret of a successful colostomy is constipation, although of course not to the extent of producing really hard scybala which might occlude the orifice.

In some clinics it is recommended that daily washouts of the bowel should be practised, but the majority of patients who start on this regime abandon it after a time when they find that with suitable modification of their diet and activities the time-consuming washouts are not necessary. Frequently there are two more or less natural actions a day, morning and evening.

The fact that in this particular case the bowel has apparently not settled down properly after five months makes one wonder whether there is any persisting cause of colonic irritation—that is, a colitis or diverticulitis. In cases which have been treated by deep *x*-ray therapy the possibility that this may have had some effect upon the nervous control of the colon must also be considered. If the patient will cut out all the roughage from his diet, and any other articles to which experience teaches him his bowel is sensitive, and will avoid those things which cause great increase in the intra-abdominal pressure (such as lifting 1-cwt. bags), he will probably find his colostomy is not too great a handicap.

Why Cook Your Meat?

Q.—*Is meat cooked just to make mastication easier, or does cooking induce some chemical change in the protein, thereby making it more susceptible to the action of the gastric and intestinal juices?*

A.—Raw lean meat is generally more rapidly digested than cooked meat, but much depends on the method of cooking. In roasting, grilling, or frying, water is lost and the remaining solids become condensed, often with excessive coagulation of the proteins, which makes them more difficult to digest. Gentle stewing is less open to this objection.

Besides making the meat soft the main object of cooking is to improve flavour, according to accepted standards of taste, both in the meat itself and in any vegetables which are cooked with it. The adequate cooking of beef or pork also removes any danger of infection by tapeworms. Raw fish often contains an antivitamin to aneurin, and at one time was responsible for the death of many foxes on American fur farms. There is no evidence, however, that this form of toxicity is ever shown by raw mammalian meat.

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